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The Stout Institute Bulletin

Thirteenth
School Year
1915-1916

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THE STOUT INSTITUTE BULLETIN

ANNOUNCEMENT
1915-1916

CALENDAR FOR 1915-1916

Thirteenth Regular Session begins September 6, 1915

Holiday vacation—December 17, 1915 - January 2, 1916

First Semester ends January 21, 1916

Second Semester begins January 24, 1916

Spring vacation—March 24, 1916—April 2, 1916

Thirteenth Regular Session ends June 2, 1916

Tenth Annual Summer Session begins July 26, 1915

Summer Session ends August 27, 1915

Vol. IX December 1914 No. 4

THE STOUT INSTITUTE BULLETIN

GENERAL INFORMATION
AND COURSES OF STUDY FOR
THE SCHOOL YEAR
1915-1916

PUBLISHED QUARTERLY BY THE STOUT INSTITUTE
AT MENOMONIE, WISCONSIN

THE STOUT INSTITUTE

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THE STOUT INSTITUTE BULLETIN

The Bulletin is issued four times during the year: March, June, September, December.

It covers the application of the principles of industrial and household arts and sciences to public school conditions and indicates how these subjects are being developed in Menomonie.

The subscription price is fifty cents per year. Sample copies will be sent upon request.

ANNOUNCEMENT

FOR THE THIRTEENTH ANNUAL SESSION OF THE STOUT INSTITUTE

MENOMONIE, WISCONSIN

1915-1916

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FACULTY

INSTRUCTORS FOR THE SCHOOL YEAR

L. D. Harvey, Psychology and Pedagogy

Milton College, B. A., 1872; Ph. D., 1898. High school principal, 1873-1879; city superintendent, 1880-1885; normal schools, 1885-1898; state superintendent, 1889-1902; superintendent Stout Training Schools, 1903-1908; president Stout Institute, 1908-

George Fred Buxton, Organization of Manual Training, Drawing and Design

Pratt Institute, 1899; Teachers College, Columbia University, bachelor's diploma in education, 1904; B. S., 1908; University of Wisconsin, summer session. 1908. Teacher of manual training, Newark, New Jersey, 1899-1901; Portland, Maine, 1901, 1903; Springfield, Massachusetts, 1904-1905; Ohio State University, summers, 1909-1910; director manual training department, Stout Training Schools, 1905-1908; Stout Institute, 1908-

A. W. Brown, Wood Finishing

Ten years' experience as journeyman painter and decorator; ten years' experience in wood finishing in piano factory, automobile and carriage shops. Stout Institute, 1911-

Otto E. Brunkow, Architectural Drawing, Freehand Drawing and Design

University of Illinois, architecture, 1911-1912; Stout Institute, 1913. Four years' practical experience in carpentry and architectural drawing; Stout Institute, 1913-

Thomas Christoffel, Cabinet Production

Three years' apprenticeship in cabinet making and inside finishing work in Switzerland; Swiss diploma in cabinet making, 1905; journeyman in Switzerland, 1905-1907; practical mill work and cabinet making experience in Wisconsin, 1907-1913. Special study at Stout Institute, 1913-1914; Stout Institute, 1914-

Fred L. Curran, Elementary Woodwork, Upper Grade Woodwork, History of Manual Training, Primary Handwork

State Normal School, Stevens Point, Wis., 1905; Stout Institute, 1908; Bradley Polytechnic Institute, summers, 1908, 1909. Teacher in public schools, 1898-1903; principal state graded schools, 1905-1907; Stout Institute, 1908-

Chas. E. Eslinger, Printing, Industrial Literature

Stout Institute, 1912. Four years' experience as practical printer; teacher of printing and primary handwork, Stout Institute, 1912-

James T. Gregerson, Joinery, Elementary Cabinet Making, Pattern Making

Class for Industrial Teachers at Milwaukee, 1912-1913, University of Wisconsin Extension Division; University of Wisconsin, 1913-1914. Eleven years' experience in various branches of pattern work; instructor in elementary woodworking, University of Wisconsin, summer session, 1914. Stout Institute, 1914-

Henry O. Grubert, Wood Turning

Served apprenticeship in German wood turning shops; fifteen years' experience in all grades of wood turning; six years' experience in turning hard rubber, bone, ivory, and amber; five years' experience as shop manager. Stout Institute, 1913-

O. C. Haack, Cabinet Making, Mill Work

University of Wisconsin, 1911-1912; Stout Institute, 1914. Practical experience in cabinet making and carpentry. Stout Institute, 1914-

H. M. Hansen, Cabinet Making, Mill Work, Saw Filing

Fourteen years' experience in mill work and as pattern maker, carpenter, and draftsman; Stout Institute, 1912.

F. F. Hillix, Machine Shop Practice, Foundry Work

Purdue University, 1904-1905; special student and instructor, Purdue University, 1905-1910. Eight years' practical experience in the metal trades. Instructor machine shop practice, Evansville, Ind., manual training school, 1910-1911; instructor foundry practice, Chicago University, summer session, 1911; Stout Institute, 1911-

R. F. Jarvis, Blacksmithing, Industrial Economics

Shop work, 1905; University of Missouri, B. S., 1912. Assistant in engineering shop work, University of Missouri, 1906; instructor manual training, Birmingham, Ala., 1907-1911; assistant in manual training, University of Missouri, 1911-1912; Stout Institute, 1912-

H. W. Jimerson, Plumbing and Heating

Journeyman and contractor, 1884-1904; director Minneapolis School of Plumbing, 1904-1908; director plumbing trade school, Stout Institute, 1908-

O. C. Mauthe, Physical Training

Normal School of North American Gymnastic Union, Milwaukee, 1895; Harvard University summer school of physical training, 1897; Chautauqua, N. Y., summer school, 1899; Gilbert Normal School of aesthetics and social dancing, Boston, summer, 1904. Physical director, Turnverein, Vorwaerts, Milwaukee, 1895-1896; West Minneapolis Turnverein, Minneapolis, 1895-1899; special instructor, Harvard University, summers, 1898, 1902, 1903; physical director, Dayton Turngemeinde, and Young Women's League, Dayton, O., 1899-1903; physical director, Shreveport Athletic Association, Shreveport, La., 1903-1909; supervisor of games, Dayton vacation schools, 1903; supervisor of playgrounds, Shreveport, La., 1905-1909; physical director, Stout Institute, 1909.

Louis F. Olson, Carpentry, General Drafting

Stout Institute, 1906; graduate work Stout Institute, 1907. Three years' practical drafting, carpentry, and contracting; teacher of forging and mechanical drawing, Stout Institute, 1907-1908; director of manual training, public schools, Madison, Wis., 1908-1911; teacher of drafting and shop work, summer sessions, Kansas State Manual Training Normal School, 1909; summer sessions, Stout Institute, 1907, 1910, 1911; Stout Institute, 1911-

J. E. Ray, Bricklaying, Cement Work

Williamson Trade School, 1908; Seven years' experience as journeyman bricklayer and foreman in various parts of the United States; Stout Institute, 1914-

Robert H. Rodgers, Supervision of Practice Teaching and Methods of Teaching Manual Training

Oregon Agricultural College, B. S. in Mechanical Engineering, 1909; Teachers College, Columbia University, B. S. and bachelor's diploma in supervision of industrial education, 1913; graduate study, Teachers College, 1913-1914; patternmaker, Portland, Oregon, 1898-1905; instructor in woodwork, turning and pattern making, Oregon Agricultural College, 1909-1912; instructor in mechanical drawing St. George Evening Trade School, New York City, 1912-1913; director of Home Thrift Association shops, New York City, 1913-1914; Stout Institute, 1914-

John O. Steendahl, Mechanical Drawing

Stout Institute, 1905. Director manual training, La Junta, Colorado, 1905-1906; The Academy of Idaho, Pocatello, Idaho, 1906-1910; head of drafting department, Portland School of Trades, Portland, Oregon, 1910-1912; Stout Institute, 1912-

Daisy Alice Kugel, Organization of Home Economics

University of Michigan, A. B., 1900; Columbia University, B. S. and diploma Teachers College, 1908; teacher in public schools, 1902-1906; teacher of domestic science, Chautauqua, N. Y., summer, 1911; Stout Institute, 1909-

Lenna G. Baker, Physiology, Home Nursing

State Normal School, Whitewater, 1907; Stout Institute, 1910. Teacher in public schools, 1907-1909; teacher, domestic science, high school, Everett, Washington, 1910-1911; Stout Institute, 1912.

Bertha Bisbey, Dietetics, Advanced Cookery

Kansas State Normal, 1893-1894; University of Chicago, summer session, 1908; Stout Institute, 1910-1912. Teacher public schools, Alma, Kan., 1900-1903; Manhattan, Kan., 1903-1908; teacher of mathematics, Kansas State Agricultural College, Manhattan, Kan.; Stout Institute, 1912-

Clara Louise Boughton, Advanced Cookery, Food Study

State Normal School, Milwaukee, 1890-1893; Stout Institute, 1909-1910. Teacher in public schools, Manitowoc, 1893-1909; director domestic science, Racine, 1910-1911; Stout Institute, 1911-

Grace R. Darling, Home and Social Economics

University of Michigan, 1884; Teachers College, Columbia University, 1892; Wisconsin Library School, Madison, Wisconsin, 1907. Teacher of history and literature, State Normal School, Oshkosh, Wisconsin, 1884-1891; teacher of history and literature, State Normal School, Milwaukee, Wisconsin, 1895-1903; Stout Institute, 1908-

Grace M. Dow, Institutional Management

St. Paul Teachers' Training School, 1897; University of Minnesota, summer session, 1910; Stout Institute, 1911. Teacher in public schools, St. Paul, 1897-1898; Stout Institute, 1911.

Eleanor M. Dunn, Food Study, Senior Cookery

Whitewater Normal School, 1906; Milton College, 1908-1909; Stout Institute, 1913. High school instructor, 1906-1908, 1909-1911; director of household arts, State Normal School, Warrensburg, Mo., 1913-1914; Stout Institute, 1914-

Selma Ericson, Trade Dressmaking

Practical work in dressmaking—apprentice, employee, and shop manager, 1901-1908; designer and fitter for commercial houses, 1908-1912-1914. Teacher in the Milwaukee School of Trade for Girls, 1913; Stout Institute, 1914-

Louise Phillips Glanton, Supervision of Practice Teaching

Harlie College, Rome, Ga., A. B.; Columbia University, B. S., and diploma Teachers College. Critic, third grade, Speyer school, Teachers College, 1902-1908; superintendent Nassau industrial school, Lawrence, Long Island, 1909-1910; director domestic science department, public schools, Montgomery, Ala., 1910-1912; Stout Institute, 1912-

Gladys T. Harvey, Interior Decoration

University of Wisconsin, 1905-1906; Art Institute of Chicago, 1906-1908; Stout Institute, summer sessions, 1908, 1911, 1912; Handicraft School of Design and Normal Art, Minneapolis, 1910-1912; Stout Institute, 1913-

Josephine W. Hobbs, Plain Sewing, Junior and Advanced Cookery and Marketing

Cook County, Illinois, Normal School, 1897; Boston School of Domestic Science, 1907. Teacher in public schools, Dubuque, 1898-1906; supervisor domestic science and matron Moore Street Neighborhood House, Cambridge, Massachusetts, 1907-1908; superintendent Y. W. C. A., Training School for Household Service, Boston, 1908-1909; director Homemakers School, Stout Institute, 1909-

Ethel Chaddock Irwin, Junior Sewing, Dressmaking

Stout Institute, 1911; Teachers College, Columbia University, B. S., bachelor's diploma in education, 1913, graduate student, 1914; assistant instructor household arts, Ethical Culture School, New York City, 1914; Stout Institute, 1914-

Nelle Johnson, Household Management, Advanced Cookery

Iowa State College, B. L., 1899; University of Minnesota, B. S., 1910; High school principal, 1889-1899; instructor Central State Normal, Edmund, Oklahoma, 1899-1908; instructor domestic science, State Normal, Spearfish, South Dakota, 1910-1911; supervisor home economics, Racine, Wisconsin, 1912-1914; The Stout Institute, 1914-

Alma Krueger, Physical Training

Normal College, North American Gymnastic Union, Indianapolis, Ind., 1911; director playground work Minneapolis, summers, 1912-1913; Stout Institute, 1911.

Elizabeth A. Lathrop, Dressmaking, Primary Handwork

Boston School of Domestic Science, 1905; Teachers College, Columbia University, 1910. Teacher of domestic art, Atlanta University, Atlanta, Georgia, 1905-1908; Stout Institute, 1910.

Mabel H. Leedom, Chemistry

City Normal School, Dayton, Ohio, 1894; Stout Institute, 1910; Columbia University, summer session, 1913. Teacher in public schools, Dayton, Ohio, 1895-1905; Stout Institute, 1910-

Mary M. McCalmont, Chemistry

West Minster College, New Wilmington, Pa.; graduate student, University of Omaha, Neb., 1911; University of Wisconsin, 1911-1912. Teacher in public schools, 1906-1907; principal of high school and supervisor of music, Woodville, Ohio, 1907-1909; city schools, Omaha, Neb., 1909-1911; Stout Institute, 1912.

Ella G. McCauley, Millinery, Art Needlework

Student Stout Institute, summer session, 1911, regular session, 1911-1912. Ten years' experience as designer and trimmer in wholesale millinery establishments; instructor in millinery, Stout Institute, 1911-

Mary I. McFadden, Psychology

State Normal School, Oshkosh, 1897; University of Wisconsin, Ph. B., 1900; A. M., 1907; University of Chicago, Ph. M., 1901; Teachers College, Columbia University, January 1908-June 1908. Teacher, Grand Rapids high school, 1891-1892; principal, Menomonee Falls high school, 1892-1893; assistant principal, Oconto high school, 1893-1895; associate supervisor of practice, Oshkosh Normal School, 1901-1906; acting assistant professor of education, University of Kansas, one semester, 1906-1907; principal Muskegon City Normal School, 1909-1910; supervisor of practice, teacher of pedagogy and music, Sauk County Training School, 1911-1912; Stout Institute, 1912-

Thomas R. Moyle, Chemistry

Lawrence College, B. S., 1899; M. A., 1912; Chicago University, 1909-1910. Teacher, Mauston Wis,, high school, 1899-1901; Sparta, Wis., high school, 1901-1903; Appleton high school, 1905-1909; Menomonie high school, 1910-1911; Stout Institute, 1911-

Mary L. Niles, Freehand Drawing and Design

Chicago Art Institute, 1902; student Minneapolis Handicraft Guild, 1908, and summers, 1907, 1908, 1909, 1910, 1911; student Prang summer school, Chicago, 1912; private student under John H. Vanderpool and Charles Francis Brown, 1901. Teacher of private art classes, 1892-1909; teacher of clay modeling and pottery, Stout Institute, summer sessions, 1909-1913; Stout Institute, 1913-

Ruth Mary Phillips, English

University of Wisconsin, B. A., 1904; graduate work, University of Wisconsin, summer session, 1905, and one semester, 1909. Teacher in high school, Lodi, Wisconsin, 1904-1905; teacher in high school, Black River Falls, Wisconsin, 1906-1910; Stout Institute and Menomonie high school, 1910-

Katherine Stanton Rutledge, Junior Sewing, Dressmaking

Grinnell College, Iowa, 1910-1912; Columbia University, B. S. and bachelor's diploma in education, Teachers College, 1914; Stout Institute, 1914-

Ruth Virginia Simpson, Junior Cookery

Illinois State Normal University, 1909-1910; summer sessions, 1906, 1907, 1908, 1909; Teachers College, Columbia University, 1911-1912. Teacher in public schools, LeRoy, Illinois, 1905, 1908; teacher of domestic science, high school, LeRoy, Illinois, 1910-1911; high school, Lead, South Dakota, 1912-1913; Stout Institute, 1913-

Clara G. Turner, Household Management, Junior Cookery

Normal School, Fredricton, N. B., 1902; Mt. Allison Ladies' College, N. B., 1906; Teachers College, Columbia University, B. S., 1912. Teacher in public schools, New Brunswick, 1903-1904; teacher of domestic science, consolidated schools, New Brunswick, 1906-1911; Stout Institute, 1912-

Louise Williams, Microbiology

McGill University, 1907; B. A. and diploma from McGill Normal School. Columbia University, M. A. 1911, and master's diploma in the teaching of biological science, Teachers College, 1911. Teacher of classics and science, Dunham College, Quebec, 1907-1909; Stout Institute, 1911-

GENERAL INFORMATION

ADMISSION, COURSES, EXPENSES, DATES

LENGTH OF COURSE

Courses leading to the diploma granted by each of the training schools for teachers require two years' work. No diploma is issued to any person who has not been a student in residence for at least one year. Upon the completion of one of these courses,—Manual Training or Home Economics,—a diploma is issued, which by statute, is made the basis for the issuance of a life certificate, after two years' successful teaching in Wisconsin.

This certificate legally qualifies the holder to teach the subjects in which training has been taken, in the public schools of the state. The certificate is issued by the Wisconsin State Board of Examiners and is accepted in most of the other states.

QUALIFICATIONS FOR ADMISSION

Graduation from a four years' high school course, or equivalent preparation, is required for admission to each of the training courses. The candidate must be at least eighteen years of age, and must be possessed of good health and physical energy, of refinement and good character. Testimonials of good character are required.

Students who have had normal or collegiate training are given credit for such of the required work in the Institute courses as they have satisfactorily mastered. Successful experience in teaching before entering Stout Institute, in most cases, reduces the amount of practice teaching required of the student.

ADVANCE ENROLLMENT

School accommodations limit the number of students who can be enrolled; for this reason persons who wish to enter should make application in advance for an enrollment blank, which should be filled out and forwarded to the school with two certificates of good character. A physician's certificate of good health and physical ability to carry on full work in the Institute, must be presented by each student when first entering the school. Enrollment is made in the order of application.

THE DEMAND FOR GRADUATES

The demand for graduates of Stout Institute as teachers of manual training and home economics is steadily increasing year by year. At the present time they are teaching or doing supervisory work in twenty-seven states and in Canada.

The number of schools in which manual training and domestic art and science are being taught is rapidly increasing and the demand for well-trained teachers of these subjects is greater than ever before.

The officers of the Institute are glad to recommend teachers to school officials who are seeking competent teachers of manual training and domestic art and science. In making recommendations every effort

is made to name candidates who by training, temperament, personality, and experience are adapted to the demands of the position to be filled. The more complete and definite the information furnished as to the kind and amount of work required, and the salary to be paid, the better they are prepared to select the person most likely to give satisfactory service. They prefer to make no recommendation unless they feel confident that they can name a candidate who will succeed.

While the officers of the Institute never guarantee positions to students upon graduation, they do everything in their power to assist graduates to positions they are qualified to fill.

THE SUMMER SESSION

Stout Institute summer sessions offer exceptional opportunities for supervisors or special teachers of manual training, domestic art and science, or freehand drawing to advance themselves along their special lines, either in technique or along the professional side. Superintendents and principals are finding in these summer sessions an opportunity for learning something of the content and method of school handwork. Grade teachers are perfecting themselves in special subjects through summer courses.

Provision is made for outings and games so that a vacation may be combined with a summer course of study.

Eighty-six courses were offered in the summer of 1914. The session for 1915 opens July 26 and closes August 27. The March (1915) number of the Bulletin will give full information concerning the courses to be offered in the summer session for 1915.

SCHOOL EXPENSES

Tuition is one hundred dollars per year, one-half payable at the beginning of each semester. A fee of twenty dollars per year is charged to cover the cost of materials used by the students in the manual training department. Students taking work in any courses not required for graduation, are charged an additional fee to cover actual cost of material used in such courses.

Board and room can be obtained at prices ranging from five to six dollars per week in private families.

LABORATORY FEES

In the science courses minimum fees are charged for laboratory work. The fees for the regular course are as follows:

General Chemistry	$5.00
Food and Household Chemistry	5.00
Bacteriology	5.00
Chemistry of Nutrition	5.00
Junior Cookery (per semester)	4.00
Advanced Cookery (per semester)	4.00
Dietetics	1.50
Model and Plain Sewing (per semester)	1.00
Drawing and Design	1.00

Dressmaking (per semester)	1.00
Millinery and Art Needlework	1.00
Primary Handwork	1.50

In addition to the laboratory fee, students are expected to pay for any breakage which may occur.

LIBRARY AND READING ROOM FEES

A fee of five dollars, payable at the opening of the school year, is required of each student.

All necessary text books are furnished from the loan text book library for the school year without any extra charge to students.

The reference library is supplied with standard reference books needed to supplement text books in different subjects and with educational and technical periodicals adapted to the needs of the students.

REFUNDS

Students who are compelled to withdraw from the Institute by reason of illness, not due to poor physical condition or ill health existing before entering, are entitled to a refund of tuition from the date when notice is received of such withdrawal, to the end of the semester.

Students boarding in the dormitories are also entitled to a refund of whatever amount has been advanced for board beyond the date when notice is received of withdrawal. Refund for advance payment for room rent in the dormitories is allowed from the date when the room is again rented, and effort is made to secure an occupant at the earliest date possible. As books and supplies for which fees are charged have to be bought in advance in quantities necessary to supply the entire enrollment, no refund of fees is made in any case.

UNIFORMS

Young women attending the Institute are required to wear uniforms during the daily sessions. Men are required to wear white overalls and jumpers in the woodworking shops and brown overalls and working shirts in the metal working shops.

A gymnasium suit is required of each student taking physical training. This work is optional for students in the home economics department. It is required for all juniors in the manual training department.

Circulars of information regarding uniforms and gymnasium suits for women will be sent to all enrolled students.

DORMITORIES

Bertha Tainter Hall accommodates about thirty young ladies. The hall is furnished with all modern conveniences, the rooms are electric lighted, and heated both by direct and indirect radiation, thus assuring ample heat and good ventilation. A large reception room, a music room, and a reading and study room for those who may prefer to study there rather than in their rooms, are provided. The hall is

three blocks from the school grounds, overlooks Lake Menomin, and is in the midst of spacious, well-kept, well-wooded grounds. It is the aim to make this an ideal home for such students as wish to avail themselves of its accommodation. The hall is in charge of a woman of experience and culture, and such regulations and supervision are maintained as insure proper conditions for health, effective work, and the proper social life of students.

Tainter Annex accommodates sixty-six young ladies and is situated on the same grounds with Bertha Tainter Hall. It is thoroughly suited to the purposes for which it is planned. It has a large central living room with two balconies and skylight above, making an attractive place for rest and social activities. The rooms are all arranged in suites of study and sleeping room, each suite for two students. The Annex has been remodeled and refitted and is in every way adequate to the needs of a school dormitory. A large dining room in Bertha Tainter Hall provides meals for students in both halls.

The charge for room for the school year for each student is sixty to eighty dollars, according to the size and location of the room. In most cases the lower rate prevails. The charge for meals and a definite amount of laundry work for each student rooming in the halls is four dollars and fifty cents per week. The amount of laundry work done under the above arrangement is the average amount each student requires weekly. A list of the different articles laundered weekly without additional charge is furnished each student. Articles not included in this list are laundered at a reasonable rate at the institute laundry.

Rooms in the dormitories will be available Saturday, September 4, 1915. Meals will be served beginning Sunday, September 5, 1915.

HOMEMAKERS DORMITORY

Two cottages furnishing home accommodations for sixteen students are provided for the students taking the homemakers course. The cost for room and board is the same as in the halls.

SCHOOL YEAR.

The school year is thirty-six weeks in length, beginning September 6, 1915, and ending June 3, 1916. Students should arrange to enter at the beginning of the school year if possible. When this is not possible students may enter at the beginning of the second semester.

The summer session is five weeks in length, beginning July 26, 1915, and ending August 27, 1915.

Address all correspondence regarding courses of study or general work of the institute to

L. D. HARVEY,
President The Stout Institute,
Menomonie, Wisconsin.

MANUAL TRAINING DEPARTMENT

COURSES OF STUDY FOR 1915-1916

The Manual Training Department offers courses for teachers of Manual Training and vocational subjects in public schools. These courses are two years in length. They furnish students an opportunity to get the broad range of work demanded for the smaller school systems, and give them a chance to specialize in certain groups of work.

The work in the junior year is required and covers elementary courses in many fields of shop work and drawing, and also courses in psychology and pedagogy, English, history and literature of manual training, and industrial economics.

Work in the senior year is divided into four groups. Courses are given in the building trades, covering architectural drawing, carpentry, plumbing, bricklaying, cement work, and painting. Courses are given in the machine trades, covering machine drawing, machine shop practice, pattern making, foundry practice, and forging. Courses are given in general wood working lines, covering advanced mechanical drawing, cabinet making, case construction, mill work, wood turning, and wood finishing. Courses are given for teachers in elementary schools, covering design, grade wood work, elementary industrial arts, and printing. Students are given an opportunity to get work in two of the four above named groups.

The new Building Trades School and equipment which has been recently added to the shops, give the best of facilities for instruction in each of the lines of work offered. The rooms are large, airy, light, and conveniently arranged. Students are made acquainted with the problems of equipping the schools in which they will teach when they leave the institute. The care of the shops and the proper handling of equipment and supplies are especially emphasized.

In each of the shop courses during the senior year, considerable emphasis is placed upon the professional aspects of the subjects. Students are shown not only the technique of the work itself but methods of organizing and teaching the special subject in public school classes. All seniors are required to take courses in organization of manual training and in methods of teaching manual training, with the observation of teaching and practice teaching.

In the different subjects described on the following pages, attempt has been made to indicate the general scope of work covered by the student and the line of instruction given by the teacher. Courses in shop work and drawing are outlined under the two main headings, practical and theoretical work, the practical work showing the type of drawing or construction handled by the student, and the theoretical work showing the line of text book work, recitation work, or lecture work covered in the classes for the purpose of information regarding the general subject.

PSYCHOLOGY AND PEDAGOGY

This work is taken at the beginning of the junior year and is limited to a consideration of principles, fundamental in character, and to the application of these principles in the actual work of teaching. Time does not permit the study of psychology as a culture subject. The students who have so studied it, but have not given consideration to the application of its fundamental principles in teaching, will need to take the prescribed course.

Special attention is given to the psychology of attention, habit, and will. Those principles of pedagogy are considered which may be shown to have a practical application in the teacher's work. In the academic, shop, and laboratory work, it is the aim of the teachers not only to have the students master the special work under consideration, both from the academic and technical standpoints, but at the same time to consider the work from the standpoint of the teacher. Practical exercises are given throughout the course, requiring a conscious application by students in their work of the psychological and pedagogical principles studied.

ORGANIZATION OF MANUAL TRAINING

This course is planned to cover problems in the organization and teaching of manual training in the public schools. It covers the theory of education and its application to manual training, the qualifications and opportunities of the special teacher, methods of teaching manual training, problems in administration and supervision of a special department, a study of the subject matter of manual training courses and details of equipment and costs of maintenance of a manual training department. Lectures, discussions, assigned readings and reports make up the work of the course.

1. Theory of Education
   Scope of manual training, physical education, mental training, English teaching, breadth of outlook, art training, and social efficiency
2. Place of Manual Training in School systems
   Relation of the manual training department to other features of the school system, sources of control, matters of school expenditure, school administration, special elementary and secondary industrial and technical schools, development of high school studies and advanced trade instruction in vocational lines of work, relation between manual training and vocational education
3. The Special Teacher
   Technical and professional training, personality, the teacher's work as a student, prospects for advancement for the special teacher
4. Methods of Teaching
   The making of teaching plans, care of tools and supplies, preparation for lectures and demonstrations, presentation of lessons, class procedure, conveniences in teaching, control of classes, the holding of proper standards
5. Supervision of Manual Training
   The selection and training of special teachers, conducting teachers' meetings, the keeping of records, general office work, the making of reports, relation of the supervisor to teachers and superintendent
6. Planning of Courses and Shops
   Formulation of purposes, arrangement of courses and plans for school shops, analysis of subject matter arranged by grades, primary hand work, upper grade shop work, high school courses, mechanical and free hand drawing, art crafts work, vocational courses
7. Equipment and Maintenance
   Kinds, quantities, and costs of tools, benches, cabinet work, miscellaneous supplies, selection and installation of equipment for various lines of school work, arrangement of shops, planning of equipment, lighting, storage of supplies, consideration of economy in the purchase of a school outfit
8. Tendencies and Outlook
   A brief review of the growth of the subject leading to a study of the present situation regarding manual training and technical education and to an examination of the tendencies and outlook

TEACHING OF MANUAL TRAINING

The purpose of this course at the beginning of the senior year is to bring about a definite realization of the principles of the teaching process. Lectures, discussions, assigned readings, observations and reports are utilized to this end. All applications are very largely made to concrete examples in the field of manual training. Under the close supervision of the instructor, observations of the work of experienced teachers are made; also during the course certain students are required to conduct classes for the purpose of observation and criticism.

Special emphasis is placed upon the preparation of lesson plans and shop management in all the different lines of work.

a. The Problem of Teaching
   1. Distinction between principle of teaching and principle of education
   2. Function of the school and teacher

b. Factors Entering Into the Teaching Process
   1. The individual with his native endowment
   2. Society with its demands
   3. Teachers of many kinds

c. Fundamental Laws of Teaching
   1. The commonly accepted principles of teaching, developed and formulated
   2. Relation of these principles to the manual training problems

d. Types of Lessons
   1. Types of lessons commonly employed in the teaching process
   2. Application of the elements of the various types to the manual training field

e. Class Room and Shop Methods
   1. Methods of presentation which cover a series of typical lesson plans for all the manual training subjects, showing approved methods of presenting that material
   2. Shop or class management which covers the assignment and distribution of students and work during the class period. Material and time records are also featured

f. Standards for Testing Results of Class Room Methods
   1. Methods of grading students
   2. Determination of the worth of subject matter and methods

PRACTICE TEACHING AND OBSERVATION

As a requirement for graduation, every student must have thirty weeks of practice teaching. Proof of successful teaching experience may at the discretion of the head of the department reduce this requirement.

The practice teaching schedule is arranged in periods of six weeks' duration, thus permitting students to gain experience in five different lines of work if it is so desired. All practice work is in connection with the public school system and ranges from the first grade hand work to the fourth year high school shop courses.

The teaching is done under the direct supervision of the special teacher of the

subject in which the instruction is given. Before taking charge of any class the student teacher must prepare and submit for criticism a lesson plan indicating the proper order of procedure for each day's work.

In connection with all practice work the student systematically observes the work of experienced teachers. The purpose of this observation is to call attention to the methods and the application of pedagogical principles to the every day school problems.

The work in practice teaching and observation is very closely correlated to the course in the teaching of manual training.

HISTORY OF MANUAL TRAINING.

The aim of this course is to follow the growth of the manual training movement. The work is carried on through assigned lessons from various references, through lectures and discussions, and written and oral reports on outside readings.

The following topics indicate the scope of the work: Early educational history; Pestalozzi and other reformers and the effects of their work; education in Germany, France, and England, with reference to industrial education and manual training; the manual labor movement; early work in Russia as led by Uno Cygnaeus and M. Victor della Vos; the work of Otto Salomon and the Sloyd movement; a general survey of manual training and industrial education in Europe; the beginnings and development of manual training in the United States; present conditions of the courses of study in manual training; demands for industrial education and how this involves the manual training studies; work of trade, vocational, and technical schools studied and compared.

INDUSTRIAL LITERATURE

This course is given to acquaint students with general educational literature, general literature of manual training, and vocational education, general technological literature and the specific literature of the various shop subjects.

1. Study of various articles and outlines in the Stout Institute Bulletins
2. Study of a large number of books on the theory of industrial education
   The following General Reports and Magazines:
3. Reports, National Education Association
4. Reports, National Society for the Promotion of Industrial Education
5. Reports, Council of Supervisors
6. Reports, Eastern Art Teachers' Association and Eastern Manual Training Association
7. Reports, Western Drawing and Manual Training Association
8. Reports, American Academy of Political and Social Science
9. Reports, U. S. Commissioner of Education
10. Reports, U. S. Commissioner of Labor
11. Manual Training Magazine
12. Vocational Education
13. The School Arts Magazine
14. The Craftsman Magazine
    The books and magazines that are available for the teacher and artisan in the following subjects:
15. Machine Shop Practice
16. Foundry
17. Forging
18. Cement and Bricklaying
19. Plumbing and Carpentry
20. Wood Turning and Pattern Making
21. Elementary Bench Work and Cabinet Making
22. Wood Finishing, Lettering, and Sign Painting

23. Printing and Bookbinding
24. Elementary Handwork
25. Freehand and Mechanical Drawing
26. Principles of Teaching, Class Room Management, Organization and Administration.

INDUSTRIAL ECONOMICS

Present day problems of an industrial nature are taken up and discussed in regard to their relations to social conditions. Questions such as the differentation of labor, trade unions in relation to trade schools, responsibility of the state in regard to factory conditions and schools within the factory are discussed.

Texts are used as a guide, but considerable supplementary reading from references is necessary. Several papers are written by each student during the year. This course does not presuppose any previous study of any of the social sciences, but is concerned entirely with the practical application of principles of economics to the industrial problems of the day. Emphasis is placed upon the study of industrial conditions which are creating the demand for vocational training in the schools.

1. Introduction
   a. Characteristics of present economic life
   b. Evolution of society, stages in man's development, comparison of characteristics of each
   c. Economic development of the 18th, 19th, and 20th centuries
   d. Relation of efficiency to economical development
2. Problems of Plant Location
   a. Conditions affecting
   b. Choice of location
   c. Construction of building, kinds of building, construction in relation to efficiency
   d. Relation of efficiency to shop conditions,—cleanliness, light, heat, ventilation, sanitation
3. Forms of Industrial Ownership
   a. Entrepeneur
   b. Partnership
   c. Corporation
4. Industrial Organization
   a. Military system of organization as found in the army
   b. Military system of organization in industries
   c. Departmental system of organization in industries
   d. Functional system of organization in industries
5. Developments and Possibilities of Functional Organization
   a. Aims of shop organization
   b. Reasons for shop inefficiency
   c. Aims of functional organization, or scientific management
   d. Application and results of scientific management
   e. Relation of scientific management and efficient workmen
6. Development of Efficiency
   a. Importance of scientific investigation, relation to school shops
   b. Demand and development for efficient production
   c. Relation of efficiency to rewards or compensation
   d. Introduction of functional organization, division of responsibility, importance of detailed instruction for efficiency, devices used tending toward efficiency
   e. Relation of management to workmen, qualifications of officers, supervision of employment, methods of shop discipline

7. Existing Wage System
   a. Day work
   b. Piece work, unscientific without records, scientific with records, Taylor's differential system of wages
   c. Premium, or bonus plan, Halsey plan, Gantt plan, Emerson plan
   d. Profit sharing
   e. Comparison
8. Labor Organizations and Problems
   a. Labor unions, trade unions, industrial unions
   b. Definition, and development
   c. Policies of labor organizations
   d. Weapons of labor organizations,—strike, boycott, picketing
   e. Employers' organizations and purposes
   f. Arbitration as a remedy for industrial disputes
9. Labor Problems
   a. Child labor
   b. Woman labor
10. Legislation in Regard to Industrial Conditions
   a. Conservation of the workman
   b. Employers' liability and compensation of workmen
   c. Legislation in regard to women and child labor
11. Industrial Education
   a. Vocational education,—development, tendencies, and purposes
   b. Attitude of manufacturers and labor unions
   c. Vocational guidance
   d. Proper shop training and the efficient workman

ENGLISH

The aim of this course is the presentation of such phases of composition work as will give the student a command, both in speaking and writing, of simple, correct, and clear English. The specific topics always vary with the needs of the particular classes. In the written English course of twelve weeks the following general topics are considered:

1. Grammatical forms
2. Diction
3. Sentence structure
4. Paragraph structure
5. Organization of long theme
6. The business letter
7. Punctuation
8. Spelling

Six weeks are devoted to oral English. The following topics constitute the work:

1. Class discussions
2. Current events
3. Organization of short talk
4. Organization of long talk
5. Enunciation drills
6. Individual criticism

MANUAL TRAINING DESIGN

Lectures are given upon the principals of design and requirements for shop training. Practice is given in the use of the pencil, pen and ink, and wash for design purposes.

1. Pencil Technique
   Free hand drawing and design as a basis for the application of design to shop constructions. An attempt is made here to develop good pencil technique and ability to work effectively
2. Applied Design
   The application of design to pottery and tile making; to cement work; to weaving and basketry and paper and cardboard work; to bench woodwork; to wood turning and cabinet making; to sheet metal work, forging, and foundry work
3. Study of Construction
   Consideration is given to the constructive requirements of different materials, and the suitability of design to different types of construction is shown.
4. Outlines and fastenings
   Through a study of typical pieces of construction peculiarly appropriate to their intended use, students are shown methods of adapting design to requirements of use of finished constructions. By means of a study of general shapes of constructions and the modification of small details, it is seen how the fundamental lines of a design may be refined. By considering the leading lines and fastenings of construction as decorative features, one method of emphasizing details of construction is seen. Designs are made for various shops.

FREEHAND DRAWING

A sketch class for teachers of shop work gives special attention to the making of free hand drawings in pencil of shop projects and details of shop equipment. Practice is given also in the making of blackboard sketches, and the use of pen and ink for illustrations of the making of school products. This course is planned especially for shop teachers' use in making ideas clear to pupils.

1. Pencil Practice
   Pencil practice begins with the study of lines and tones in pencil, and the use of the different qualities of pencil. This is followed by a representation of different materials in pencil, with a study of surface textures
2. Perspective Sketching
   Objects are sketched in outline in perspective, and include furniture and interiors, student construction from the manual training shops, and illustrations of students at work at various occupations
3. Sketching in Light and Shade
   Sketching in light and shade covers in pencil and charcoal the same general line of work as that which is done in outline. This is followed by blackboard sketching and a rapid use of the soft pencil for the making of explanatory sketches

ELEMENTARY MECHANICAL DRAWING

PRACTICAL WORK

1. Parallel lines
   Proper use of T square, scale, triangles, and pencil in sheet lay out and exercise in drawing of parallel lines.
2. Upper case letters
   Letters first drawn five eighths each high to give a conception of the correct formation, followed by work in which letters are made the conventional size
3. Lower case letters
   Letters first drawn large, then reduced to conventional size
4. Simple straight line drawing
   Drawing of a straight or stepped cylinder, introducing the use of center line and methods of dimensioning
5. Circles and tangents
   Use of bow compass and large compass, joining of straight lines to curved
6. Geometric constructions
   Four of the most commonly used constructions
7. Ellipse construction
   Application of the curve, four methods employed
8. Ink work
   Use of lettering and ruling pens and compass, previous exercises inked

9. Simple projection exercise
   Problems involving the showing of two views of wood turning exercises, and applying tangent arcs and dimensioning
10. Ink and pencil tracings
    Two view working drawing
11. Serving table or other wood construction
    Three view working drawing to scale with details
12. Tracing
    Selected exercises giving students a knowledge of the use of tracing cloth

THEORETICAL WORK

1. General outline of course
2. Requirements for correct drafting practice
3. Methods of laying out a sheet
4. Established drafting conventions
5. Selection and care of drafting instruments
6. Good system in lettering practice
7. Comparison of styles of letters
8. Geometric construction and geometric proof
9. Definitions of geometric curves
10. Ink and pencil tracings
11. Blue printing problems and processes
12. Working drawing requirements
13. Schemes for dimensioning difficult drawings
14. Drafting standards in speed and accuracy

PROJECTION DRAWING

a. Elementary orthographic projection

1. Solid, showing three views
2. Solid, revolved with end at 30° to V plane
3. Hexagonal prism, with one face parallel to H and axis at 60°

b. Developments

4. Rectangular prism
5. Rectanguar prism cut by an oblique plane

c. Projection and development

6. Hexagonal prism cut by an oblique plane
7. Cylinder cut by a plane
8. Hexagonal pyramid cut by an oblique plane
9. Entire surface of a triangular prism cut by a plane
10. Entire surface of an oblique square prism cut by a plane
11. Three-piece elbow
12. Section of a dome and true length of hip rafter
13. Surface of an oblique hexagonal pyramid
14. Flange and hood cones of a ventilator
15. Conical connector

d. Intersections

16. Cylinder cut by an oblique plane
17. Conic sections
18. True curves of a hexagonal nut
19. True curves of a square nut
20. Intersection of a plane and a surface of revolution
21. Two prisms, axes intersecting at right angles
22. Two prisms, axes not intersecting
23. Cylinder and cone

e. Projection problems

24. Two views given to project the third
25. Fly wheel to scale
26. Isometric sketch of casting given to project a three-view working drawing

f. Isometric drawing

27. Revolution of a solid to the isometric position
28. Construction lines and circles
29. Oil stone
30. Cabinet
31. Section of a pulley

g. Oblique projection

32. Slotted block
33. Cube with circles on three faces
34. Table, using "cabinet" method

h. Mechanical perspective drawing

35. Perspective diagram
36. Simple solid
37. Cabinet

MACHINE DRAFTING

PRACTICAL WORK

a. Sketches

1. Angle iron,—tool base or selected casting
   Method of sketching
   Selection of views, dimensioning, use of finish marks
2. Face plates,—hand wheel or pulley, two views
   Sketching,—use of cross section paper
   Use of center lines and sections
3. Selected casting or machine parts, three or more views, making sketch from object
   Dimensioning and checking

b. Working drawings

4. Angle iron
   Working from sketches
   Laying out work, order of penciling
   Proper dimensions, value of conventional lines
5. Working drawing from sketch,—compass work
   Working from center lines, method of sectioning
6. Selection of views, details, and checking selected plates
7. Pedestal bearing
   Sketching details from diagram.
   Drawing and assembling parts
8. Special selected shop problem
9. Machinist's vise
   Selection and location of views
   Detailing, dimensioning, checking, assembling
10. Gas engine details
    Sketching and drawing from castings
11. Special shop problems
    New equipment and break-down jobs
    Special work for technique, speed, and skill

c. Conventions for threads

12. Helix and application
    Method of drawing helix
    Use of elements and projection of points
    Use of French curve
    Application in V and square threads
13. Thread conventions
    Laying out threads, single and double pitch
    Elevations and sections of threads and tapped holes
14. Standard machine screws
    Laying out cap, set, and machine screws
15. Standard bolt and nut
    Working from formulae,—drawing hexagonal and square heads and nuts

d. Gearing

16. Spur gear,—34 teeth, 4 pitch
    Use of formulae, designing gear blank
17. Rack and pinion
    Drawing tooth outline in mesh
18. Bevel gear
    Blocking out diagram, angles of blank, true shape of teeth
19. Worm gear and wheel
    Use of formulae, computing lead
    Conventional section
20. Internal gear
    Use of base system
21. Heart-shaped cam
    Uniform motion, use of elements
22. Accelerated motion cam
23. Crank
    Tracing path of point during revolution

f. Tracing

24. A number of tracings are made by each student. Drawings made by the students are selected for this work

e. Cams and crank motions

THEORETICAL WORK

1. Importance and value of machine drawing
2. Purpose and outline of course
3. Use of text and methods of study
4. Method and value of note books
5. Application of helix,—threads, springs, screw propellers
6. Threads,—pitch, lead, strength, types
7. Fasteners,—screws, bolts, rivets, cotter pins, keys
8. Conventional symbols,—materials, sections, finish, sizes
9. Use of formulae, fractions, decimal equivalents
10. Sketching,—value, methods, place in course
11. Working drawings,—value and commercial importance
12. Classes of drawings
13. Selection and location of views
14. Order of penciling and value of conventional lines
15. Dimensioning
16. Use of sections
17. Notes,—bills of material, specifications
18. Detailing and assembling
19. Checking
20. Tracing and order of inking
21. Equipment and materials
22. Texts and other publications
23. Organization of course and professional aspects
24. Function of working drawings
25. Classes of working drawings
26. Office practice
27. Problems in transmission of power
28. Function and development of gears
29. Systems of gears and gear formulae
30. Ratio, speed, and strength of gears
31. Cams and applications
32. Cranks and crank motion
33. Tracing and blue printing
34. General reference materials

PRACTICAL WORK

a. Elementary architectural drawing

1. Line drawing
   An exercise sheet for practice
2. Masonry
   Six common types and trimmings
3. Sill constructions
   Six common types in sections
4. Floor framing
   Girders, joists, headers, trimmers, and lintels in floor framing problem
   Plan, elevation and section at 1/4"=1 ft. scale
5. Wall framing
   Sections and elevations of main and partition walls
6. Roof framing
   Framing construction for a hip or gable roof
7. Moldings
   Classic and modern moldings in section
8. Cornice details
   Rake and straight box, exposed, and returns of same
9. Cellar sash and frame
   Section and elevation at 1½"=1 ft. scale
   Full size sectional detail
   Section and half interior—half exterior elevation of frame and setting of same in wall
10. Casement sash and frame
    Section and half interior—half exterior elevation at 1½"=1 ft. scale
11. Double hung window
    Section and elevations at 1½"=1 ft. scale
12. Door details
    Front and rear outside doors in elevation and detailed section
13. Stair construction
    Straight, turn, and wind stairs in plan and elevation
14. Stair details
    Starting newel, skirt board, balustrade
15. Lettering plate required each day until high standard of efficiency attained

b. Architectural sketching

1. Lettering
2. Moldings
3. Windows,—sash, casement, double hung, colonial, grouping
4. Doors,—interior, exterior, entrances
5. Cornices
6. Chimenys and fireplaces
7. Roofs,—gable, hip, dormers
8. Stairs
9. Porch construction,—steps, floor, columns, balustrade, cornice, roof
10. Floor plans,—three types of houses
11. Elevations,—two sides of one type
12. Perspective sketch involving all exterior details studied

c. Advanced architectural drawing

1. Survey of a well-planned 8-room house with modern conveniences and heating system
   Methods of procedure—sketches in elevation preceding floor-plan sketches for dimensions
   Drawing methods and kinks
   Details of construction
   Dimensioning
2. Working plans from survey
   First floor plan
   Second floor plan
   Basement plan
   Roof and attic plan
   Four elevations
   Detail sheet of interior trim and stairs
   Tracing on cloth—blue prints
3. Original plan of 8-room house with modern conveniences, including hot water or steam heating system, from specifications
   Preliminary perspective sketches and floor plans to be approved
   Complete floor plans
   Elevations
   Details—cornice, stairs, trim
   Tracings on cloth—blue prints
   Specifications
   Detail of heating system

4. Original plan of store front and apartment—three-story building in brick or stucco, or combination
   Preliminary perspective sketch and floor plans
   Plans and elevations
   Details, front, stairs, etc.

THEORETICAL WORK

a. Elementary architectural drawing

1. Significance of an architectural course in a given school
2. Architectural drawing—an explanation of the nature of the work
3. Line drawing an important part of work in architecture
4. Masonry
5. Sill constructions
6. Technical and trade terms and definitions
7. Floor framing
8. Wall framing
9. Roof framing
10. Dormers
11. Moldings
12. Cornice
13. Sash,—conventions, sizes, terms
14. Cellar sash
15. Casement sash
16. Double hung window
17. Window grouping
18. Doors
19. Grade entrance
20. Stairs—general, laying out, etc.
21. Balusters and balustrades
22. Interior finish
23. Exterior finish
24. Gutters and conductors
25. Chimneys and fire places

Trips to jobs in course of construction to enable student to see constructions in application.

Blue print sheets of molding details, lettering, plumbing conventions and bath room arrangements, and material conventions.

b. Architectural sketching

1. Lettering
2. Moldings
3. Windows
4. Doors
5. The entrance
6. Roofs
7. Cornices
8. Dormers
9. Roof covering
10. The cellar sash
11. The basement
12. The grade entrance
13. Chimneys and fireplaces
14. Stairs
15. Porch design
16. Porch columns
17. Balustrade
18. Cornice
19. Roof—porch
20. Types of dwelling houses
21. The modern house
22. Building sites
23. Building materials
24. House planning
25. Division of space within walls of house
26. Rooms—their requirements
27—The types of wall construction
28. Variety, balance, and unity in design

c. Advanced architectural drawing

1. Scope of work
2. Requirements of an instructor in architecture
3. The survey
4. Sketching in domestic architecture
5. Perspective sketching; with delineator and freehand
6. Criticism of types of construction
7. Criticism of design
8. Criticism of arrangement of rooms
9. Detailing from construction
10. Deducing measurements from construction
11. Tracing on paper — short cuts and time-saving methods
12. Titling
13. Requirements of the medium-sized house
14. The store front
15. The flat
16. The stair problem in the flat
17. The roof problem in the flat
18. Steel construction, beams and girders
19. Cornice construction
20. The heating plant
21. Lighting problem, sunlight and artificial
22. Chimneys and flues
23. The basement problem
24. Store front design
25. Design in brick
26. Design in stucco

27. Wall construction and dimensions
28. Stone work and trimmings
29. Specifications
30. Contracts
31. Bonds

GRADE WOODWORK

PRACTICAL WORK

1. Name plate
   Use of plane, try square, and rule
2. Key label
   Use of brace and bit
3. Plant label
   Laying out, chiseling slant cuts
4. Shipping tag
   Use of compass, chiseling and sandpapering rounded end
5. Cord winder
   Use of saw, more difficult chiseling
6. Fish line winder
   Cutting ends with saw and chisel
7. Pencil sharpener
   More difficult laying out and chiseling
8. Match scratcher
   Putting on sandpaper
9. Water wheel
   Making half lap joint, assembling, and nailing
10. Bird house
    Squaring several pieces of stock to size and assembling
11. Bill file
    Squaring up rough stock to three dimensions, chamfering, boring
12. Bread board
    Laying out rounded corners and edges, use of chisel and file.
13. Game board
    Laying out octagon, chamfering
14. Plant stand
    Chiseling curved corners, fastening feet with glue and brads
15. Coat hanger
    Laying out curve from measurements, use of spoke shave
16. Bracket shelf
    Designing, use of coping saw, fitting of parts, careful sanding of surfaces
17. Pencil box
    Cutting grooves, fitting cover
18. Glove box
    Review of previous exercises, more difficult fitting of corners, staining and waxing
19. Whisk broom holder
    Laying out, boring, sawing, chiseling
20. Hat rack
    Chamfering, designing pegs
21. Hammer handle
    Laying out, use of spoke shave and sandpaper, oiling
22. Hatchet handle
    Laying out curved form
23. Glove box
    Cutting rabbet joint, sawing apart, hinging, staining, and shellacking
24. Pen tray
    Gouging, polishing
25. Pen and ink stand
    Designing shape, careful cutting to fit ink well
26. Letter box
    Squaring to exact dimensions, assembling

27. Foot stool
    Upholstering
28. Wall cabinet, or other piece of furniture
    Grooving, paneling, mortising and tenoning, fitting and hanging door; staining and shellacking

THEORETICAL WORK

1. Care and use of woodworking tools
2. The manual training room and the shop
3. Manufacture and use of common materials,—woods, nails, screws, glue, sandpaper
4. Economy in use of materials
5. Kinds of wood to be found in the locality
6. Common commercial woods in the United States
7. Woods used extensively in manual training
8. Teaching board measure to grade boys
9. Courses of study in grade woodwork
10. How provide work for fast workers
11. How promote habits of industry in manual training room
11. Shall we emphasize class or individual teaching?
12. Kinds of stains used in manual training work
13. Simple upholstering
14. Suggestions on equipping

JOINERY

PRACTICAL WORK

1. Planing and sawing exercise
   Reading drawing, getting out a bill of material, order of planing, use of the laying out tools such as the gauge, rule, try square, and knife, analysis of the jack plane, try square, gauge, rule, and back saw, sawing to a line, use of the bench hook
2. Crosslap joint
   Measuring, squaring, planing, gauging, sawing, and chiseling, giving the first use of the chisel
3. End mortise and tenon joint
   Laying out, sawing to a line, using the rip saw, chiseling end grain
4. Slip stretcher joint
   Laying out a miter, sawing a miter, using the back saw, fitting joint
5. Miter box
   Bill of material, ripping out rough stock, working stock to dimensions, screwing together, laying out miters on box, sawing to lines, use of winding sticks
6. Through mortise and tenon joint
   Working out a mortise, using cabinet maker's method, also working out mortise, using brace and bit
7. Half lap dovetail joint
   Laying out dovetail, checking dimensions, sawing to lines and chiseling
8. Dovetail corner
   Laying out three multiple dovetails on the member to be inserted, gauging depth line, setting bevel square to proper angle, laying out dovetails with bevel square, sawing and chiseling to lines, laying out on the other member, using method of superposition, gauging proper depth, sawing and chiseling to lines
9. Drawing board
   Bill of material, ripping out stock and planing glue joint, gluing and clamping, use of the double end match plane in tonguing and grooving, planing large surface flat and true, squaring sides and ends, boring holes for plugs and screws, fastening on end pieces with screws, sandpapering
10. Project chosen by student
    Must be made of hardwood and include some gluing up work

THEORETICAL WORK

1. Kinds of planes, their parts and the uses to which they are put
2. Kinds of chisels, their parts and the uses to which they are put
3. Saws, kinds and what they are used for
4. Various kinds of screws and how to use them
5. Principles of joinery
6. Outline of a course of study
7. Mortise and tenon joint,—where applied
8. Dovetail joints,—applications
9. Lap joints,—where applied
10. Glue,—kinds, tests, and how to prepare
11. Woods,—hard and soft, plain sawn and quarter sawn
12. Clamps,—kinds, how applied and their advantages and disadvantages
13. Woodworking tools listed in the order of their importance in trades
14. Equipment needed for bench woodworking
15. Open and closed equipments

PATTERNMAKING

PRACTICAL WORK

1. Pattern for planer block or knock-off bar
   Review of the fundamental tool processes, uses of the gouge, introduction of the principles of draft and shrinkage, use of center lines, sandpapering and shellacking
2. Pattern for angle iron or small bracket
   Making a pattern maker's layout involving a reproduction of the original drawing and the addition thereto of finish and draft, determination of how to mold pattern, use of leather, wood, and wax fillets, methods of placing them
3. Pattern for gibbed way
   Different methods of molding such a pattern, use of loose pieces to facilitate the operation of molding, method of construction and fastening loose pieces to a pattern
4. Pattern for exhaust pipe flange
   Layout for pattern, continued application of the principles of draft, shrinkage, and finish, introduction of the green sand core, working down stock to make solid fillets
5. Pattern and core box for jig plate or drop lever
   Application of the principle of vertical coring, use of cope and drag core prints, core prints turned between centers on lathe, construction of core-box, use of wooden dowel pins, working out hole for core with gouge, and method of shellacking prints and core-box
6. Pattern and core-box for brass bushing or pawl carrier sleeve
   Applying the principle of horizontal coring, the split pattern type of construction, preparation of stock for turning, use of pinch dogs, screws, corrigated fasteners and glue to hold parts together while turning, pattern turning and the use and care of wood turning lathe and tools, construction of half core-box, use of core-box plane
7. Pattern and core-box for lifting arm or eccentric arm, split pattern construction, vertical and horizontal coring, chuck turning, working out of solid wood filleted corners, fastening wood to chuck
8. Pattern and core-box for pipe tee
   Making of working sketch from casting and laying out same with necessary allowance for draft, shrinkage, finish, and core prints, construction of split pattern built up from turned pieces, laying out and gouging out core-box from solid piece of stock
9. Pattern and core-box for steam carrier arm
   Laying out and sawing out with band saw, allowing for solid wooden fillets, use of knife and spoke shave in working down contour, use of templates to insure good work, turning hubs and bosses, and setting ribs
10. Pattern and core-box for pipe Y or T
    Principle of right and left hand core-box construction, joining two turned

pieces at an acute angle, use of rapping plates and metal dowels, framing in core-box, use of loose pieces

11. Pattern for gear blank
    Lathe chuck turning and rechucking to finish off reverse face, sandpapering and shellacking in lathe
12. Pattern for hand wheel
    Getting out segments, use of face plate and methods of fastening segments, getting out and gluing arms, laying out arms and sawing, fastening arms in place, turning up rim and bosses, finishing arms and rim at bench
13. Core-boxes for large fly wheel
    Method of molding fly wheels, using cores and green sand, making layout, core-box for rim cores, core-box for flange, core-box for arms, core-box for hub, bolt hole core-box, core-box for split, lug core-box, skeleton box for center core, section of rim
14. Pattern and core-box for return bend
    Working sketch taken from casting, making layout, using above sketch, use of template, balancing core prints and turning core-box partially in lathe, building up core-box at bench
15. Pattern and core-boxes for globe valve
    Turning pattern, construction of two core-boxes to make allowance for valve seat, use of mortise and tenon to bring a core together

THEORETICAL WORK

1. The place of the pattern maker in industry
2. Machinery pattern making
3. Stove pattern making
4. Structural steel pattern making
5. Metal pattern making
6. Hand and machine tools
7. Opportunities pattern making offers as a trade
8. Materials for pattern making
9. Shop equipment and organization
10. First aid to the injured
11. Safety devices
12. Outline of a course of study
13. Laying out benches and machines in certain size rooms
14. Use of tables and formulae in pattern work
15. Theory underlying the use of jigs in pattern making
16. Stave construction; its advantages and disadvantages
17. Glue heaters; kinds and quality of each
18. Equipment needed in pattern shop
19. Methods of storing lumber economically
20. Visits to shops, engine rooms and foundries

CARPENTRY

PRACTICAL WORK

a. Tool practice

1. Measuring and sawing exercise
2. Leveling exercise
3. Plumbing exercise
4. Nailing exercise

b. Construction practice

1. Floor framing exercise
2. Wall framing exercise
3. Cutting opening in floor and wall exercises

c. Floor framing for complete cottage

1. Laying out, cutting, and setting sills, joists, bridging, headers, trimmers
2. Laying sub floor
3. Squaring and leveling the floor frame

d. Wall framing

1. Laying out, cutting and setting plates, studs, headers, trimmers, ribband, and gable studs
2. Plumbing and bracing
3. Erecting scaffolding
4. Sheathing walls

e. Roof framing

1. Figuring span, run, rise, pitch, and rise per foot
2. Laying out, cutting, and setting common, hip and valley, jack, and cripple rafters
3. Laying out and framing openings
4. Sheathing

f. Outside finish

1. Cornice work,—laying out, cutting, and setting plancher, facia, crown moulding, frieze and bed moulding on a box cornice
2. Shingling
3. Setting window and door frames
4. Cutting and setting outside base and corner trim
5. Spacing, cutting, and nailing siding
6. Porch work

g. Inside finish

1. Covering walls with common lath, sheathing lath, plaster board or wall board
2. Fitting sash, adjusting and tying cord and weights, fitting and fastening stops
3. Trimming door openings,—setting jambs, base blocks, side and head casings
4. Trimming window openings,—setting stool, side and head casings, and stops
5. Hanging doors,—fitting, hanging and mortise locking, fitting and setting door stops and threshold
6. Fitting and setting base, shoe, mouldings, and angles
7. Setting dadoes and built-in fittings
8. Finishing stairs,—fitting and setting risers, treads, stringers, skirting boards, saddles, stair posts, balusters, hand rails, and mouldings
9. Flooring,—fitting, nailing, scraping and sanding hardwood floor

THEORETICAL WORK

1. Braced frame construction
2. Balloon frame construction
3. Prices of pine and hemlock dimension stuff
4. Use of the two-foot rule, steel square and steel tape
5. Use of saw and hammer
6. Floor construction
7. Wall construction
8. Framing openings
9. Use of straight edge and level in framing
10. Laying out and squaring a foundation or floor frame
11. Prices of pine and hemlock boards and shiplap
12. Kinds, sizes and prices of nails
13. Figuring and listing material for framing complete cottage
14. Sash and window openings
15. Door openings
16. Types of roofs
17. How to figure common rafters
18. How to lay out common rafters
19. How to figure hip and valley rafters
20. How to lay out hip and valley rafters
21. How to figure and lay out jack and cripple rafters
22. Types of cornice—design and purpose
23. Details of cornice construction
24. Listing window and door frames
25. Kinds and grades of framing lumber
26. Prices of drop siding, ceiling and flooring
27. Types of outside finish-design and purpose
28. Details of outside finish
29. Types of inside finish
30. Kinds of material used in inside finish
31. Details of construction in inside finish
32. Listing inside finish for a complete cottage
33. Types of stair flights
34. Figuring risers, treads and head room
35. Carpentry as a trade
36. Carpentry as an educational subject
37. Carpentry as a subject in a public school curriculum

MILL WORK

PRACTICAL WORK

1. Stock for projects in other classes
   Planning the proper sequence of processes, considering condition of raw material, and requirements of same when milled, use of power saws, jointers and planers, work in several thicknesses, sizes, kinds and grades of lumber.
2. Stock for mill work construction problems
   Window and door frames, lockers, desks, tables, work benches, cabinet work, sash, doors, screens, mouldings, according to practical demands of the school needs
   Repeated practice on the above, for higher standards, further requirements, closer work and more stress on the economy of time and material
3. Further mill work along the lines of construction
   Mortising, tenoning, sticking, and relishing, grooving, dadoing, rabbeting with power machinery, repeated practice and drill
4. Fitting of saws
   Jointing, filing, swaging or setting, gumming
5. An occasional repair job
   As demanded by wear and tear
6. Belt lacing exercises
   Practice pieces and applications
7. Setting up machines for their respective work
   Saws, jointers, planer, mortiser, tenoner, moulder or sticker
   Special jobs, when opportunity and ability permit
8. Adjusting bearings
   Lining up, babbiting, scraping and fitting of bearings
9. Sharpening knives
   Laying out and grinding of moulding knives
10. Molder work
    Setting up moulder and running mouldings

THEORETICAL WORK

1. General acquaintance with the equipment, methods, rules and regulations of the shop
2. Precautions pertaining to "safety first" and relative to the efficiency of the finished work on saws, jointers, and planers
3. Considerations governing the proper sequence of processes with reference to:— ripping, resawing, surfacing, cutting off, jointing, re-ripping, according to conditions of raw material and requirements of finished material
4. Instruction referring to standard ways and order of giving dimensions of material, openings, pertaining to the woodworking trade, commercial trade terms and abbreviations, their application and reference to construction regarding vertical or horizontal positions, lumber and mill bills of different kinds
5. Benefits derived from good habits of keeping shop in order and also the forming of habits of doing things thoughtfully and systematically, care and sharpening of machine knives
6. Pointing out organization of systematic commercial shop work relative to piece or repeat work and efficiency
7. Precautions pertaining to "safety first" and relative to quality of finished work on the mortiser, tenoner, moulder or sticker, and the order in which operations should be done
8. Care of saws, different ways of fitting them up, sequence of processes, why and how to go about same
9. Methods of splicing belting, advantages and disadvantages, the care of belts
10. Considerations for the placing of machinery, different kinds of power and ways of connecting up, determination of speeds, selection and cost of machines, care and construction of bearings
11. Preparation for babbeting, preparing and pouring babbet, fitting of bearings and oil channeling

12. Methods of finding and grinding the shapes of machine knives for a given moulding
13. Setting up and running of moulder
14. Drying and care of lumber
15. The trade and its demands upon the worker

ELEMENTARY CABINET MAKING

PRACTICAL WORK

1. Box
   Application of the dovetail joint, freehand sketch giving dimensions and general outlines, mechanical drawing showing details of construction and design, bill of material showing number of pieces, thickness, width, and length of each piece, getting out stock, measuring, squaring, gauging, ripping and cross-cutting, reduction of stock to exact dimensions involving planing surface and edge, and to size, laying out dovetails on the member to be inserted, gauging depth line, setting bevel square to proper angle, laying out dovetails with bevel square, sawing and chiseling to lines, laying out dovetails on the other members, using method of superposition, gauging proper depth, sawing and chiseling to lines, scraping where necessary and sandpapering all pieces, gluing sides and ends, application of glue to proper surfaces, clamping and squaring, gluing on tops and bottoms, nailing, separation of box top from the bottom part, laying out line around box, ripsawing and planing joint, sandpapering, staining, oiling or fuming, shellacking and waxing, placing hinges and lock, laying out gains for hinges, chiseling and fitting, placing of hinges in position, boring holes and driving screws, laying out mortise for lock, keyhole located and bored, working out mortise for lock and selvage, finishing keyhole, insertion and screwing on of lock, placing escutcheon, strike located and mortised in, screwing of strike in place
2. Taboret
   Use of the mortise and tenon joint, freehand sketch showing general outlines and main dimensions, mechanical drawing showing details of construction, design and all dimensions, bill of material showing number of pieces, thickness, width and length of each piece, getting out stock in rough and reduction to exact dimensions, laying out mortises, boring and chiseling to lines, laying out tenons, sawing cheeks and shoulder to lines, fitting and assembling of parts, gluing legs and rails together, screwing on top of taboret, cleaning up project, staining, oiling or fuming, shellacking and waxing

THEORETICAL WORK

1. Analysis of joints used in box construction
2. Kinds of wood used in furniture making
3. Principles of design as applied to furniture making
4. Systematic methods of working; how to get out duplicate pieces
5. Planing chamfers and rounding corners
6. Methods of fastening
7. Wood finishing, fuming, staining
8. Kinds and parts of hinges
9. Mortise and tenon joints as used in furniture making
10. Doweled joint construction
11. How to set clamps when gluing up rails and legs
12. Outline of a course of study in furniture making
13. Shop equipment and management
14. Visit to furniture factory and stores
15. Layout of benches in certain sized rooms

TABLE CONSTRUCTION

PRACTICAL WORK

1. Making a working drawing
   - Selection of joints
   - Detailing or rodmarking
2. Method of fastening parts together
   - Selection of material
3. Stockbilling
   - Selection of style and design
   - Laying out of stock from detail drawing
4. Making of glue joint
   - Cutting stock to size
   - Framing or paneling
5. Turning of legs
   - Squaring up stock
   - Laying out for size and style
6. Bench work before assembling
   - Fitting rails
   - Sandpapering parts
   - Assembling before gluing
7. Various kinds of construction
   - Mortise and tennon
   - Doweling or dovetailing
   - Drawer construction
8. Finishing
   - Staining, fuming or dyeing
   - Varnishing or waxing
   - French polishing

THEORETICAL WORK

1. Style and design
2. Construction of tables
3. The mortise and tennon joint
4. Doweling
5. Dovetailing rails and legs
6. Detailing from drawing
7. Method of stock billing
8. Shop equipment
9. Various general tools
10. Individual tools
11. Different kinds of lumber, their advantage and disadvantage for furniture making
12. Purpose of course in table construction
13. Wood turning as an application in the manufacture of furniture
14. Scheme of factory production
15. Opportunities in the trade

CASE CONSTRUCTION

PRACTICAL WORK

a. General acquaintance

1. Drawing of cabinet
2. Estimation of stock to be used
3. Lumber bill
4. Mill bill

b. Machine work

5. Stock for cabinet
   - Proper use of machines
   - Rough cutting of stock
   - Machining to dimensions
   - Machine joints,—mortises, tenons, grooves, tongues
   - Machine finishing, — rabbiting, tapering, beveling

c. Bench work

6. Legs
   - Face marking
   - Laying out
   - Dovetail joints
7. Rails and stiles
   - Face marking
   - Laying out,—proper allowance for length of tenons and horns
   - Relishing and trimming of tenons
8. Top
   - Selection of stock as to grain
   - Making sprung glued joints
   - Giving top slight crown
   - Sawing and planing to dimensions
9. Drawer
   - Face marking
   - Laying out tenons of dovetail joints
   - Cutting of tenons
   - Laying out mortises from tenons
   - Cutting mortises
   - Fitting back
   - Fitting bottom
   - Gluing of drawer
10. Assembling of parts
    - Fitting of panels
    - Fitting of bottom and partition
    - Gluing
    - Method of fastening top

d. Veneering

11. Panels
    - Selection of veneer
    - Jointing of veneer
    - Matching grain of veneer
    - Jointing of core stock
    - Jointing of cross banding
    - Gluing veneered panels
    - Use of veneer press

e. Finishing

12. Completed cabinet
    - Fitting hardware
    - Smoothing,—planing, scraping, and sanding
    - Staining
    - Filling
    - Shellacking
    - Sanding
    - Varnishing
    - Rubbing

THEORETICAL WORK

1. Logging
2. Scaling of logs
3. Sawing, scaling, and grading of lumber
4. Piling, seasoning, and drying of lumber
5. Computing amounts and cost of lumber
6. Use of each machine in the mill
7. Care of machines
8. Cost of machines
9. Machine speeds
10. Precautions for working about machines
11. Face marks,—purposes, considerations in making selections
12. Laying out,—purposes, methods, rules for proportions of joints
13. Glue and clamps,—kinds, care and proper application, condition of glue and stock to be glued, tension of clamps and time required for drying glue
14. Tools and equipment,—various kinds, sizes, and uses, styles and names of parts, cost and care, grinding, honing, sharpening
15. Trade terms
16. Making of veneers
17. Advantages of veneered panels over solid panels
18. Possibilities of matching grains
19. Advantages and disadvantages of cloth and paper tape
20. Methods of gluing
21. Work of the glue press
22. Hanging doors
23. Extent and requirements of smoothing
24. Stains,—water, spirit, and oil
25. Proper use of shellac
26. Sandpaper and its place in finishing
27. Varnish and varnishing
28. Rubbing,—pumice stone and rotten stone

WOOD TURNING

PRACTICAL WORK

a. Chisel exercises

1. Plain cylinder
2. Step cylinder
3. V grooves
4. Beadings. (These include the various ways of manipulating the skew chisel)

b. Gouge exercises

5. Concave grooves
6. Reversed groove and bead combination
7. Bead and groove combination, involving the gouge operation

c. Beginning hard wood turning

8. Handle of hard wood
9. Mallet head,—fitting and polishing
10. Tool handle,—fitting ferule and polishing

d. Face plate exercises

11. Plain cylinder
12. Step cylinder
13. Rosette
14. Towel ring of hard wood
15. Tray for cards or jewelry
16. Candle stick

e. Tool handles

17. A variety of handles for various kinds of tools

f. Oval turning

18. Hammer handle and screwdriver handle,—three center application

g. Fancy spindle turning

19. Gavel
20. Spindle
21. Mouldings

h. Chuck work, and re-chucking

22. Problems involving the accurate fitting for chuck and rechucking, as billiard ball, bowling ball

i. Fitting and assembling turned work

23. Turned problems of combinations of spindle and face plate work

j. Built-up work

Building up stock for turning in two or three different colors of wood for dumb bells, Indian clubs and other applications

k. Designed problems for larger work

24. Table legs
25. Pedestals
26. Applications for furniture construction

l. Spiral turning

27. Pedestals, table legs, lamps, candle sticks

m. Rectangular turning

28. Making of apparatus for rectangular turning, fastening stock for rectangular work, turning rectangular spindles and other applications for furniture

n. Oval work

29. Oval rosettes and picture frames, table tops and oval racks

o. Clamp chuck work

30. Reversed chucking making pipe
31. Reversed knee umbrella handle

THEORETICAL WORK

1. History of turning
2. The turning lathe without a wheel
3. Foot power lathe
4. Counter shaft equipment
5. The friction clutch equipment
6. The individual drive motor lathe
7. Speed for different types of stock
8. The skew chisel as scraping tool or finishing tool
9. The gouge as scraping or finishing tool
10. Grinding and sharpening of tools
11. Calipers for testing and measuring
12. Why soft wood is used for beginners
13. Turning as a trade
14. Products of the lathe made in commercial shops
15. The various materials used in turning
16. Design as a factor in turning
17. Problems in design
18. Established styles used for design
19. Preparation of stock for staining and dyeing
20. French polishing
21. Rubbing for dull finish
22. Face plate and its uses
23. Cup chuck and its uses for rechucking
24. Various ways of testing problems
25. Planning courses of study
26. Cost of materials
27. Turning as a trade in foreign countries
28. Spiral work,—laying out spiral
29. Cutting, chiseling, filing, and finishing

WOOD FINISHING

PRACTICAL WORK

1. Pine panel
   One face oiled two coats; the other face rubbed and varnished with one coat of shellac and two coats varnish rubbed with pumice stone and oil
2. Oak panel
   One face stained, shellacked and waxed; the other face filled, shellacked, varnished with three coats, and rubbed
3. Oak panel
   One face natural finish, filled, shellacked, and varnished three coats; the other face divided to show the steps in the varnish finish

4. Birch panel
   One face of natural finish, shellacked and varnished with two coats; the other face stained, shellacked, given four coats of varnish and hand polished
5. Gumwood panel
   One face given a white enameled finish; the other face showing the steps in making the white enamel finish; including primer, two coats of flat white, one coat white enamel, rubbed with pumice and water
6. Oak panel
   Both faces original in methods of treatment
7. Fumed panel
   Both faces fumed; one face moistened with tannic acid, shellacked and waxed
8. Other panels
   Varied to suit the time, interest, and ability of the class
9. Practical work
   Painting school-room walls, cottages built by students, and pieces of equipment; finishing various jobs about the school
10. Students who have had work in elementary wood finishing and those who wish to develop special ability in making rubbed finishes are offered advanced work in general wood finishing, varnishing, and polishing

THEORETICAL WORK

1. Condition of the wood for securing a finish
2. Sandpapering and smoothing the work
3. The foundation or basis of the finish
4. Linseed oil and its uses in all branches of wood finishing
5. The manufacture of linseed oil
6. Shellac and its use in connection with the finishing of wood
7. Shellac and its production
8. Wax conditions under which it must and must not be used
9. Stains and staining,—the making of stains, water stain, spirit stains, oil stains
10. Advantage of the different kinds of stains
11. Fillers,—paste and liquid filler
12. Different woods requiring the different forms of fillers
13. Varnishes,—rubbing varnish, finishing varnish
14. The manufacture of varnishes,—how the varnish gums are obtained, an examination of varnish gums and their solvents
15. Pumice stone and rotten stone
16. Rubbing with pumice stone and oil
17. Rubbing with pumice stone and water
18. The advantages of each process
19. The production of pumice stone
20. Polishing,—the piano polish, the semi polish or satin finish
21. Selection and care of materials
22. Commercial practice in wood finishing
23. Suggestions for handling wood finishing in school shops

SAW FILING

PRACTICAL WORK

1. Drawing of teeth
   Study of teeth to get proper angles for cross cut and rip saws
2. Laying out teeth on piece of soft steel
   Reproducing above drawing on the sheet steel, which is given to the student in suitable size for filing practice
3. Roughing out teeth
   Cutting away waste stock with file, or in some cases getting teeth roughed out in machine shop
4. Top jointing
   Evening up the points of the teeth on a line and forming a guide by which to bring the teeth to a point

5. Setting
   Bending the teeth by different methods for the purpose of giving clearance for saw blade
6. Sharpening
   Filing teeth on face, or front and back, to bring them to a point on the top jointed line, and give them the proper pitch, and fleam or bevel
7. Side jointing
   Evening up the amount of set, and removing bur edges formed by filing
8. Application to actual saw filing
   After exercises in rip and cut of teeth have been mastered, students take up the actual filing of saws for practical use

THEORETICAL WORK

1. Different kinds of work which saws perform in different kinds of wood
2. Shapes of saws and their teeth necessary for proper work
3. Commercial manufacture of saws and matters requiring special care
4. The selection of saws for specific uses
5. Care and handling of saws
6. Fitting a saw and keeping the teeth properly shaped and spaced in successive fitting
7. Keeping saws in proper shape in public schools
8. The teaching of saw filing in woodworking classes

FORGING

PRACTICAL WORK

a. Building and care of fire

Method of building
Kind of coal, analysis, sources
Adjustment, and familiarity with forge

b. Drawing and bending

1. Drawing exercise
   Drawing round stock square, and square stock round
   Use of hammer, forge, and tongs
2. Gate hook
   Drawing round stock square, and square stock round
   Bending eye and hook, twisting of square stock
3. Square eye bolt
   Drawing square stock to rectangular, square stock to round
   Calculation of material, bending eye
   Cutting of threads
4. Hook
   Bending eye, bending hook
   Drawing round stock to round taper

c. Upsetting and welding

5. Welding exercise (fagot weld)
   Handling of fire for welding
   Conditions affecting welding
   Welding temperature
   Upsetting
   Fullering and forming eye
6. Welded ring
   Calculation of stock
   Upsetting of ends
   Bending and scarfing of ends
   Welding and shaping of ring
7. Welded hook
   Bending and shaping of eye
   Welding
   Bending and shaping of hook
8. Chain (five links)
   Bending and scarfing of ends
   Welding and shaping of links
   Joining together of links
9. Flat washer
   Calculation of stock
   Upsetting and bending of stock
   Scarfing and welding
   Shaping of washer
10. Bolt
    Upsetting
    Bending of stock for head
    Welding of head to bolt
    Forming of head square

d. Forming

11. Hook
    Upsetting eye
    Punching and shaping eye
    Drawing and bending hook
    Shaping hook
12. Pin
    Bending stock for collar
    Welding collar to pin
    Punching and shaping eye

13. Coat Hook
    Forming head of hook
    Drawing stock
    Splitting and drawing stock for braces
    Bending and shaping hook
14. Forge tongs
    Forming jaws
    Welding iron handles to soft steel jaws
    Drilling and fitting tongs
    Riveting and shaping to stock

c. Bench tools

15. Center punch
    Forging of tool steel
    Hardening and tempering
16. Cold chisel
    Forging of tool steel
    Hardening and tempering
17. Chipping chisel
    Forging of tool steel to thin surfaces
    Hardening and tempering
    improvised brick forge
18. Screwdriver bit
    Drawing of steel to round taper
    Hardening and tempering

f. Lathe tools

19. Side tool
    Forming cutting edge
    Hardening and tempering
20. Internal boring tool
    Forming cutting edge
    Hardening and tempering
21. Cut off tool
    Forming cutting edge
    Hardening and tempering

g. Case hardening

22. Forging small wrench from soft steel
    Grinding and polishing
    Use of gas furnace, carbonization with bone meal
    Coloring with potassium nitrate
23. Case hardening with potassium cyanide
    Carbonizing of bolts, nuts and washers

h. Forge tools

24. Hot cutter
    Punching eye, drawing head and blade
    Hardening and tempering
25. Set hammer
    Punching eye, drawing head
    Hardening and tempering
26. Hardie
    Drawing shank under power hammer
    Forming shoulders, drawing blade
    Hardening and tempering
27. Handle punch
    Punching eye, drawing head and blade
    Hardening and tempering

i. Hand hammers

28. Riveting hammer
    Punching eye, forming head, drawing pene
    Grinding and filing
    Hardening and tempering
29. Cross pene hammer
    Punching eye, forming head, forming pene
    Grinding and filing
    Hardening and tempering
30. Ball pene hammer
    Punching eye, forming head, and pene
    Grinding and filing
    Hardening and tempering

j. Art forging

31. Exercises
    Spirals, scrolls, twists, and bulbs
32. Applications
    Simple decoration, handles, drawer pulls, fork, sheet metal problems, lanterns, lamps, decorative forging, fire sets, andirons, brackets

THEORETICAL WORK

1. Blacksmith coal, analysis, advantages, sources
2. Description and uses of various blacksmith tools
3. Analysis and organization of problems
4. Literature of forging,—magazines, trade journals
5. Literature of forging,—books, pamphlets
6. Kinds of forges, advantages, cost, manufacture, installation
7. Factors influencing welding
8. Kind of welds and uses
9. Anvils, anvil bases, advantages, installation
10. General and individual tools, number of each necessary, method of purchasing, costs
11. Fluxes, method of using, welding of steel
12. Iron, method of purchasing, kinds, cost, where purchased
13. Methods of calculating stock

14. Use of tables,—where found
15. Brazing, its place in forge shop
16. Heat treatment of steel
17. Effect of heat on structure or texture of grain
18. Methods of hardening and tempering
19. Methods of annealing
20. Cooling baths, advantages one over another
21. Methods of mining iron, kinds of ore
22. Reduction of ore
23. Crucible process of steel production
24. Classification and comparison of steels
25. Steel hardening metals, comparison and uses
26. Heat treatment of alloy steel
27. Case hardening with bone meal
28. Case hardening with potassium cyanide
29. Coloring steel, browns, blues and black
30. Hardening and tempering with lead, or cyanide of potassium
31. Gas furnace and related equipment
32. Literature of tool smithing,—books, magazines, catalogs
33. Steels, methods of ordering, cost, manufacture, care of steel
34. Grinding wheels, kinds, manufacture, speeds, and costs
35. Oxy-aceteleyne welding, ralation to forging
36. Thermit welding, relation to forging
37. Electric welding, relation to forging
38. Commercial practice in hardening and tempering large numbers of articles
39. Place of design and proportion in forging

FOUNDRY PRACTICE

PRACTICAL WORK

a. Bench molding

1. Flat backs,—molds made in the drag entirely
   Face plates, discs, jack heads, shaper blocks, drill press exercises
   Any simple pattern having a flat face and no cores
2. Flat backs with green sand cores
   Chucking exercises, hexagon nuts, gear blanks, shift collars, chipping exercises
   Any flat back pattern that has a green sand core
3. Mold, using a solid pattern that requires coping down
   Webbed gear blanks, stove door, pulley, bench, sand cup, hammered metal stake
4. A few molds made by bedding in
   The pattern is selected for the student, having in mind the skill that he possesses
5. Molds from split patterns
   Pipe fittings, eccentrics, pulley, jack screw base, visse jaw, vise frame

b. Floor molding

6. Bench bracket, core plate, planer exercises, bottom board
7. Any large work that may be needed at the school is done. The foundry is never short of such jobs
8. Molding by bedding in
   A few molds are made to illustrate this principle, the most characteristic of which is the flask weight

c. Core making

9. Simple cores from half boxes
   Bench vise nut, tee fitting, ell fitting, jackscrew, vise jaw, piston, foundation plate
10. Cores from boxes having loose pieces, and split boxes
    Steam cylinder, engine frame, port cores, vise base, sheave, gear tooth, worm wheel

d. Cupola practice

11. This includes the work necessary to prepare for a heat and the pouring off together with the shaking out of the molds

e. Brass furnace

12. This includes the work necessary to prepare for a heat and the pouring off together with the shaking out of the molds

THEORETICAL WORK

1. Character of work
2. Names of tools and terms used in the foundry
3. Molding sands, grade determined by work to be done
4. Chemical and physical properties of molding sands
5. Silica and silicates in molding sands
6. Soda or potash in molding sands
7. Alumina, lime, iron, magnesia in molding sands
8. Organic matter, combined water
9. Fineness, how graded
10. Tempering the sand; riddles and their care
11. Distinction between methods of molding; flasks
12. Bench molding; flasks; bench rammer
13. Facing material
14. Plumbago or lead, adulterations
15. Sea coal, how used, how made
16. Facing material, how mixed and used
17. Pouring off, tools used, precautions
18. Shaking out
19. Core materials
20. Core sands
21. Core binders
22. Flour as a binder
23. Rosin as a binder
24. Glue water as a binder
25. Linseed oil as a binder
26. Liquids used in wetting core sands
27. Mixing core binders
28. Cupola practice
29. Methods of charging
30. Blast pressures, influence on melting
31. Tools used
32. Brass furnace
33. Crucibles, care and abuse
34. Tools and uses

MACHINE SHOP WORK

PRACTICAL WORK

a. Lathe work

1. Cylindrical turning exercise
   Location of centers, testing, drilling, tool setting
   At this time all exercises that require cylindrical turning are started in the order that they occupy in the particular course
2. Taper turning exercise
   Calculation of the taper, taper turning, fitting the taper, file finish, polishing
   All the taper turning that will come in the course is done at this time
3. Screw cutting exercise
   Calculating change gears, cutting right hand, and left hand threads, fitting thread to gauge, getting accurate thread, of correct shape and perfect finish
4. Chucking exercise
   Use of chuck, use of boring tools, internal threading, radial facing, use of limit gauges
5. In addition to special exercises that are given to drill the student on all the above processes, the lathe work on the following is also done: Standard arbor, reamer, tap, milling cutter, plug-gauge, gear-blank, jig bushings, bolts, nuts, screws, parts of steam engine, parts of electrical motors, gasolene motors, and a large number of special things used for repairs and additions to the present equipment

b. Shaper work

6. Exercise of cast iron
   Use of shaper tools, planing up of a rectangular block; leaving smooth surfaces and the faces square with one another
7. Jig body on shaper
   Laying out of work, setting of work, use of the different tools, and working to close limits
8. Keyway
   Setting of tools and the use of the gauge

c. Planer work

9. An exercise of a rectangular block is done by all.
10. A large amount of large work requiring planing is also done

d. Drill press work

11. A layout is made on the shaper exercise and a number of holes are drilled
12. Such other drilling as is required in the progress of the work is done by the student

e. Milling machine work

13. An exercise designed to require as many different milling processes as possible is made
14. The milling is done on the following exercises: arbor tap, reamer, gear, milling cutter, holes in jig frame, and many others incident to assembly and repair

f. Finish grinding

15. All hardened work, as tools and cutters, is finished by grinding. Cylindrical work is ground in the construction of machines, arbors, gauges, reamers, knives, and parts for jigs are finished by grinding

THEORETICAL WORK

1. History of the lathe, its parts, uses, and operation
2. Chisels and hammers for bench work
3. Machine shop materials
4. Use and care of the tool grinder
5. Wheels and abrasives
6. History and origin of machine tools
7. Equipment of the machine shop
8. Laying out work, use of markings, preparation and tools used
9. Turning to diameter, shape of tool, grinding, setting
10. Taking cut, feeds, cutting speed and how found
11. Finishing to exact size, use of calipers, kinds and how set
12. Expressing the taper, standard tapers, how measured and produced
13. Manufacture of files, kinds, use, and care
14. Methods of checking, gaging, and factors necessary for accurate bench work
15. Characteristic hand finishes for bench work
16. Thread cutting, kind, shapes, formulae, how produced
17. Scraping flat surfaces
18. Babbiting and fitting bearings
19. Kinds of belts and methods of lacing
20. Various uses of files
21. Shaper, its parts, use, and adjustment
22. Screw cutting on lathe, formulae for gearing, shape of tools, and setting
23. Kinds of chucks, use precautions, scope of work, and care
24. Range of face plate work, methods of clamping, precautions, and counter balance
25. Examples of angle plate work, methods of clamping, special chucks and fixtures
26. Shape of boring tools, their use, setting, and precautions
27. Calculation of size of hole of internal threading, shape of tool, setting of tool, taking cut, fitting, precautions
28. Place of bench work in machine course
29. Methods of finishing lathe work; file and emery cloth, speed lathe
30. Description and use of cold saw with precautions, care, and sharpening
31. How a taper thread is produced, tools used, setting, precautions
32. Theory of cutting tools and application to machine tools
33. Cutting speeds and feeds

CEMENT WORK

PRACTICAL WORK

1. Section of sidewalk
2. Section of curb and gutter
3. Mounting block
4. Section of floor with drain
5. Troughs,—hog, chicken
6. Posts,—fence, hitching
7. Building block
8. Simple steps
9. Roller
10. Garden pottery,—jar, vase, urn
11. Drinking fountain
12. Pedestal
13. Bench or small bridge
14. Baluster
15. Stucco applications
16. Cement block walls

THEORETICAL WORK

1. Manufacture of Portland cement
2. Concrete aggregates
3. The proportioning, mixing, and placing of concrete
4. Construction and use of cement forms
5. Concrete foundations and walls
6. The surface finish of concrete
7. Cement products
8. Concrete sidewalks, curbs, and gutters
9. Retaining walls and steps
10. Fence and hitching posts
11. Vases, urns, flower pots, pedestals
12. Reinforced slabs and culverts
13. Cement blocks
14. Ornamental concrete without molds
15. Making concrete forms in sand molds

BRICKLAYING

PRACTICAL WORK

1. Cornice of 4″ wall, running bond, struck joints, involving mixing and spreading of mortar and proper method of laying brick
2. Corner of 9″ wall, American bond, struck joints, followed by 13″ wall of the same bond
3. Corner of 9″ wall, Flemish bond, struck or gauged joints
4. Corner of 9″ wall, English bond, struck or V—tuck joints
5. Corner of 9″ wall, Dutch bond, struck or raked joints
6. Corner of 9″ wall, showing footing or 13″x17″ pier on footing
7. Hollow wall, 10″ or 14″, with 2″ air chamber, header or strap ties
8. Hollow shaft or flue, 16″x21″, supplemented by double flue in basement wall or corner flue in first story wall
9. Single octagonal corner, 9″ wall
10. 4″ veneer on frame construction
11. 8″x12″ flue having plain top
12. 12″x16″ flue having crown top
13. 16″x16″ flue having beehive top
14. 16″x16″ flue having panel top
15. Brick steps, porch entrance
16. Octagonal bay containing window frame
17. Segmental arch,—rowlock
18. Semi-circular arch,—rowlock
19. Segmental arch,—bonded gauged
20. Semi-circular arch,—bonded gauged
21. Combination jack and segmental arch
22. Intersecting arches
23. Groined arches
24. Dentiled cornices
25. Cornice with geometrical design
26. Ornamental pilasters
27. Flat or jack arch
28. Quoined arch,—bands intersecting
29. Quoined arch,—courses intersecting
30. Gambrel roof gable
31. Fireplace design
32. Ornamental panel design

THEORETICAL WORK

1. Proper mixing of lime mortar for spread work
2. Method of gathering mortar and spreading properly with a trowel
3. The building of walls with various bonds and thicknesses, with various joints, involving the raising of corners, plumbing and leveling, and the use of lines
4. The use of running bond
5. American bond and Flemish bond
6. Oblique and herring bone bonds

7. Design for chimney tops
8. Developing one, two, and four flues from a 9" wall
9. Design for pilaster work
10. Arch design and construction
11. Methods of building arches
12. Mixing mortar for buttered work
13. Various methods of buttering
14. Colored mortar,—proportioning, mixing
15. Color schemes for harmony and contrast in bricklaying
16. Quoined piers and arches
17. Ornamental work,—panels, diaper work, zig-zag bonds
18. Principles used in designing fireplaces
19. Causes of faulty fireplaces
20. Planning of courses in bricklaying
21. Equipment of the school shop
22. Economy in the use of materials in shop courses
23. The mathematics of bricklaying
24. Opportunities in the bricklaying trade
25. Estimating materials and labor for jobs

PLUMBING

PRACTICAL WORK

a. Threaded iron pipe work

1. Frames of iron pipe
   - Use of cutters, stocks and dies, reamers, and taps
   - Cutting and fitting according to plan
   - Work with common fittings, unions, couplings
   - Testing to hold water pressure in frame
2. Pipe railing or rack
   - Extra drill upon the above processes
   - Handling of rail fittings
   - Setting up work
3. Run of iron pipe in a partition wall
   - Solving the problem of fitting pipe into a house
   - Roughing in ready for installation of fixtures
4. Commercial job
   - Piece of actual work, new or repair

b. Soil pipe work

5. Vertical joints
   - Making caulked joint
   - Fitting branches of soil pipe
   - Cutting soil pipe
6. Horizontal joints
   - Making caulked joint
   - Fitting branches of soil pipe
   - Fitting iron pipe into soil pipe
7. Run of soil pipe as in a typical installation
   - Making drain connections from fixtures
   - Making vent connections
   - Setting of traps and clean-cuts
   - Connection with sewer
8. Commercial job
   - Piece of actual work

c. Soldering

9. Running straight seams
   - Use and care of soldering iron
   - Cleaning surfaces of metal
   - Finishing work neatly
10. Running angle seams
    - Care in turning

11. Lining of sink or tank or small box with lead
    - Fitting of lining
    - Running accurate seams at corners
12. Pipe soldering
    - Making cup joint
    - Making overcast joint
    - Making blind joint
13. Commercial job
    - Piece of actual work, new or repair, needed about the buildings

d. Joint wiping

14. Horizontal joint
    - Preparation of joint
    - Setting up of joint
    - Preparation and use of wiping cloth
15. Vertical joint
    - Preparation and setting up of joint
    - Wiping joint
16. Branch joint
    - Setting up and wiping of joint

e. Erecting fixtures

17. Connecting range boiler for house installation problem
    - Setting up of boiler
    - Making proper connections with range
    - Connecting with gas heater
    - Connecting with furnace
18. Kitchen sink or bath room lavatory
    - Fastening fixtures in place
    - Use of lead pipe or nickle pipe
    - Selection and use of traps of the vented and unvented types
19. Bath tub
    - Setting up tub
    - Use of drum trap
20. Closet
    - Connecting with or without local vent
21. Laundry tubs
    - Connecting with exposed supply pipes

THEORETICAL WORK

1. Cutting and threading iron pipe
2. Definitions of common fittings, unions and couplings
3. Description of iron pipe tools
4. Manufacture and cost of iron pipe and fittings
5. The house system of iron pipe installation
6. The use of iron pipe for other purposes
7. Soil pipe and its use in plumbing
8. The manufacture of soil pipe
9. Soil pipe fittings
10. Advantage of soil pipe work
11. Comparing wrot iron and soil pipe for plumbing installations
12. Method of pouring the different joints and the proper amount of lead
13. Rain water leaders
14. The roof jacket
15. The house drain and its terminal
16. The main sewer in the street
17. The cesspool
18. The septic tank
19. The manufacture of solder, sheet lead and lead pipe
20. Wiping and soldering compared
21. Why copper is used for soldering iron
22. Different methods of heating the soldering iron
23. Fluxes for soldering
24. Where and why lead is the better material
25. Joint wiping and its advantage
26. The evolution in plumbing
27. The water supply—its source and conveyance
28. The pneumatic system of water supply
29. Meters,—gas and water
30. Gas piping and the several kinds of gas

31. Fixture traps,—main drain and grease traps
32. The domestic supply of hot water
33. Instantaneous heaters
34. Making of sanitary pottery and enameled ware
35. Heating,—steam, hot water, vacuum, warm air furnace

PRINTING

PRACTICAL WORK

a. Straight composition

1. Exercise paragraphs set with different kinds of type
   - Use of composing stick, composing rule, and leads
   - Spacing and justifying lines
   - Dumping composing stick and tying type matter
   - Taking proof and marking errors with proof marks
   - Correcting type matter on galley and in stick
   - Distribution of type matter

b. Outline work

2. Composition from given copy
   - Indentations of different distances from left margin
   - Roman numeral headings
   - Arabic numeral headings and sub-headings
   - Locking corrected type matter in chase
   - Inking, and oiling presses
   - Making ready on presses
   - Feeding stock into presses

c. Booklet composition

3. Booklet or circular of eight or more pages
   - Setting type involving straight and outline composition
   - Reading proof and holding copy
   - Correcting on galley and taking revised proof
   - Making the galley matter into pages of the required length
   - Imposition of pages in the chase for particular forms
   - Feeding sheets into press with and without slip sheeting
   - Folding sheets into sections
   - Binding sections into booklets by stapling or sewing

d. Display composition

4. Simple display, as illustrated by tickets, mottoes, note book labels
   - Preparation of copy
   - Making a number of small sketches to illustrate the various arrangements of lines and masses
   - Selecting suitable type according to nature of job
   - Mechanical execution of the problem
   - Cutting paper stock to the required size
   - Different kinds of blanketing on presses
   - Use of different kinds of inks with various papers
5. Poster composition
   - Making plan from rough copy
   - Consideration of the attractive force expected of a poster
   - Composition of large type required in poster work
6. Decorative problems in colors as illustrated by announcement and greeting cards
   - Designing problem with reference to principles of proportion, balance, and harmony
   - Composing and making up the required form for each color
   - Mixing inks to obtain special shades
   - Careful setting of gauge pins and feeding to secure proper register
7. Advertisements of various kinds
   - Study of good advertisements to determine principles of arrangement
   - Laying out copy in accordance with the above principles
   - Use of type adapted to peculiar advertisements
   - Use of rules, borders, and ornaments in composition of advertisements

8. Stationery, envelopes, and cards
   - Personal, professional, and business use is studied
   - Peculiarities of each kind are considered
   - Composition of a letter head, using type designed for such purpose
   - Composition of envelope return corner to match letter head
   - Method of locking envelope corner in chase
   - Make ready for envelope and various methods of feeding into presses

e. Leader forms

9. Program with leader lines
   - Kinds and sizes of leaders
   - Use of leaders to lead the eye from point to point
   - Combination of leaders and type in one line
10. Commercial form where leaders form the horizontal lines
    - Use of leaders to form lines
    - Advantages of leaders over rules for certain work

f. Rule forms

11. Composition where type and rules are lined on base line
    - Kinds and sizes of rules
    - Method of lining rules with type
12. Composition where rules are used at right angles to each other in same form
    - Use of metal furniture to make up form
    - Splicing rules for lengths
13. Composition where two rule forms are used in combination
    - Building vertical rule form
    - Building horizontal rule form to be printed over above
    - Locking in chase with beveled furniture
    - Use of rollers, bearers or supporters
    - Make ready for rule work, overlays and underlays, cutting out and scraping to secure even impression

g. Tabular composition

14. Composition on a table or formula for shop use
    - Composition in narrow measure
    - Difficulties in centering, aligning, and justifying
15. Composition on students' programs or schedule of classes
    - Composition of separate columns
    - Making up units of form
    - Building complete form

THEORETICAL WORK

1. Printing tools and materials
2. Printing terms and their meanings
3. Mathematics of paper cutting
4. Point system
5. Point body—point set—point lining system
6. Kinds of type cases
7. Mathematics of comparative weights of paper
8. Difference between body type and job type
9. Classification of job type
10. Characteristics of common families of job type
11. Mathematics of point system
12. Locking rule forms in chase
13. Locking forms for color work
14. Calculating stock for job
15. Imposition for sheetwise form
16. Imposition for work and turn forms
17. Printing inks and how to choose for different purposes and papers
18. Care of press rollers
19. Calculating amount of type on page
20. Use and abuse of decorative material of the print shop
21. Balance as the printer should use it
22. Harmony of shape and color in printing
23. Proper proportion in good printed matter
24. How to determine a well-proportioned page—mathematically and graphically
25. Typography of advertisements
26. Mechanical principles of job press
27. Platen and cylinder presses

28. Courses in printing,—general purposes
29. Courses in printing,—vocational purposes
30. Courses in printing,—art purposes
31. Planning of school shops
32. Suggestive equipments
33. Hints on installing equipment
34. History of printing
35. Modern printing machines
36. Paper making,—by hand and machinery
37. Copper plate engraving
38. Embossing
39. Photo engraving
40. Wood engraving

SPECIAL SHOP WORK

a. Whittling

1. Seed marker,—laying out, whittling straight with grain, and at an angle
2. Pencil sharpener,—gluing on sandpaper
3. String winder,—more difficult whittling at an angle
4. Shipping tag,—use of compass and auger bit, whittling to curved line
5. Glove mender,—laying out and whittling taper on four sides, whittling to round form
6. Paper knife,—laying out octagonal handle, whittling irregular curves in forming blade

b. Tinsmithing

1. Processes involved,—laying out, cutting, folding, soldering, wiring, riveting
2. Tools used,—soldering furnace, soldering coppers, riveting hammers, snips, wiring machines
3. Materials used,—solder, gasoline, rosin, acids, rivets, tin
4. Projects made,—boxes, trays, cups, measures, funnels, dust pans

c. Bent iron work

1. Square mat,—making drawing, laying out, cutting iron, shaping, fitting, clinching binders
2. Candlestick or post card holder,—designing, laying out and cutting pieces, bending to pattern, binding
3. Bridge truss work,—drawing, making wooden framework, cutting pieces, bending, fitting, binding, painting

d. Home repair work

1. Refinishing chair,—scraping, sanding, applying ground color, applying varnish stain
2. Chair caning exercise,—laying out and making frame, running vertical, horizontal, and diagonal strands, binding
3. Key fitting,—taking lock apart and noting construction, filing and fitting key
4. Glazing window,—cutting glass to dimensions, setting glass in sash, puttying
5. Rope tying and splicing, sharpening axes, skates, and knives. This work is explained and carried out as far as time permits. Its importance in public school work is considered.

PRIMARY HANDWORK

a. Paper and cardboard construction

1. Book problems
   Folders,—for free cutting
   Portfolios,—single folded paper, straw board cloth covered
   Note book covers,—covered, one and two-piece covers
   Paper files,—for pocket and desk use
   Pamphlets,—for various purposes, kinds of sewing, ways of folding
2. Box problems
   Open boxes,—corners lapped, reinforced with stay tape
   Folding boxes,—made from one piece of material
   Covered boxes,—various materials, fastenings, lining, covering
   Sliding boxes,—fitting of case and covers
3. Card problems
   Mounts,—for pictures and drawings
   Book marks,—cutting, decorating

   Post cards,—cutting, ornamenting
   Shipping tags,—cutting, gluing
4. Envelope problems
   Mailing envelopes,—working from dictation
   Filing envelopes,—different uses, work from drawings
   Envelope files,—flat and book
   Paper sacks,—flat, with folds, commercial sacks

b. Weaving

1. Small mat (4″x6″)
   Making cardboard loom, stringing warp, weaving, finishing
2. Small rug (6″x9″)
   Wooden loom, stringing warp, designing border, weaving, weaving border, finishing
3. Raffia mat (4″x6″)
   Making of cardboard loom, stringing linen warp threads, weaving body and colored border
4. Semi-circular bag, marble bag, doll's Tam O'Shanter, stocking cap, sweater, or hammock
   Students choose one of these problems, make cardboard loom, string warp, weave and complete problem

c. Basketry

1. Coiled mat (strap stitch)
   Preparing reed, starting center, wrapping reed with raffia, the stitch, finishing
2. Raffia basket (3″ in diameter)
   Selecting stitch, starting like mat, shaping basket, design or border, handle
3. Reed mat (5″ in diameter)
   Splitting spokes, starting center, with raffia, weaving with reed, finishing edges
4. Reed basket (not over 5″ in diameter)
   Number four spokes not split, starting with number two reed, weaving, finishing edge

d. Clay work

1. Type forms and applications in solids
   Cube and prisms,—boxes, books, buildings, familiar objects
   Sphere and cylinder,—apples, oranges, football, barrel, bottle
   Cone and pyramid,—bell, tower, grain stack, lighthouse, tree forms
2. Poses
   Children,—proportion, rough sketching with clay details
   Animals,—pets or familiar animals, study of form, securing shape, finishing details
3. Pottery
   Small bowls,—making ball, cutting into hemispheres, shaping bowls
   Dishes,—building by pieces
   Vases,—rolling coils, forcing coils together, shaping, smoothing

PHYSICAL TRAINING

Regular work in the gymnasium and natatorium is taken throughout the manual training course unless students are excused by the director. Four periods each week are given to exercises, games, swimming and normal gymnastics. The athletic association is given charge of athletic activities, and manages basketball, baseball and football teams.

SCHEDULE OF MANUAL TRAINING CLASSES

JUNIOR YEAR	SENIOR YEAR
Psychology and Pedagogy	Organization of Manual Training
English	Observation and Practice Teaching
History of Manual Training	Class Talks
Industrial Literature	Faculty Talks
Industrial Economics	Advanced Architectural Drawing
Class Talks	Advanced Machine Drawing
Faculty Talks	Advanced Projection Drawing
Elementary Mechanical Drawing	General Drafting Practice
Projection Drawing	Upper Grade Woodwork
Elementary Architectural Drawing	Table Construction
Freehand Drawing	Case Construction
Architectural Sketching	Cabinet production
Elementary Machine Drawing	Mill Work
Joinery	Advanced Carpentry
Elementary Woodwork	Advanced Wood Turning
Elementary Cabinet Making	Advanced Wood Finishing
Saw Filing	Advanced Pattern Making
Elementary Wood Turning	Advanced Bricklaying
Elementary Pattern Making	Advanced Cement Work
Elementary Wood Fnishing	Advanced Plumbing
Carpentry	Advanced Forging
Elementary Plumbing	Advanced Foundry Work
Elementary Bricklaying	Advanced Machine Shop Practice
Elementary Cement Work	Trade Drafting
Elementary Forging	Advanced Printing
Elementary Machine Shop Practice	Manual Training Design
Elementary Printing	Physical Training
Primary Handwork	
Special Shop Work	
Physical Training	

HOME ECONOMICS DEPARTMENT

COURSES OF STUDY FOR 1915-1916

Domestic Science and Domestic Art are terms that are applied to the lines of work here grouped under Home Economics. The term is not satisfactory, but is used because it is more generally understood to include the full range of subjects than either of the others. The scope of the subject matter here outlined covers the following points: Foods and their uses, cookery, general science, sewing, millinery, textiles, drawing and house decoration, emergencies and home nursing, household management, and professional subjects.

FOOD STUDY

A complete and systematized study of all foods shows composition, structure, nutritive ratio, digestibility, cost, and place in the diet. It includes a study of the chemical and physical changes which take place in foods during cooking and the effect of various temperatures on the digestibility and food value of the various foods. Work in food study is closely correlated with the work in junior cookery, so that one complements the other.

The place of food study in the public school curriculum, its correlation with other subjects, and the methods of presenting the work in public school classes are discussed.

1. Cell
   Definition, physical structure, chemical composition, functions, types
2. Tissues
   Classification, cell structure
3. Metabolism
   Digestion, absorption, circulation, assimilation, excretion
4. Foods
   Definition, classification, digestion, absorption, elimination, storage, source, chemical composition, and functions of each group. The classification of foods is that used in food chemistry
5. Vegetable foods
   Classed as roots and tubers, cereals, legumes, green vegetables, fruits
6. Animal foods
   Meats, fish, poultry, eggs, milk and its derivatives

Each food is studied in detail, varying with the different ones, but in general covering: kind, cultivation or growth, distribution, preparation for market, transportation, care in the home, market products and prices, chemical composition, digestibility, fuel value, dietetic value, cookery, uses.

ELEMENTARY COOKERY

Elementary cookery is especially designed to meet the needs of those planning to become teachers of domestic science. The student is trained, therefore, not only to obtain good results in housekeeping and cookery, but also to think and work with a view to presenting the subject matter to others. Foods are studied and tested to learn the effect of heat and moisture upon them, and the principles of cookery thus determined are applied in the preparation of simple foods and combinations of food. It is planned to secure a thorough understanding of the theory

and method involved in the cooking of the more fundamental foods, rather than to cover the whole field of cookery. Sufficient repetition of processes is given to insure a fair degree of skill in the manipulation of utensils and materials. Attention is given to the systematic organization of the school kitchen and its management. The cost of foods is studied in relation to the income of the home and of the school, and the cost of the lessons is worked out to serve as a basis for comparison.

1. Simple carbohydrate foods
   Potatoes, cereals, tapioca
2. Seasonable vegetables
   Tomatoes, spinach, root vegetables, egg plant, beans
3. Preparation and use of dried fruits and vegetables
   Peach, pear, apricot, prune, beans, peas
4. Study of batters and doughs
   Popovers, griddle cakes, muffins, cornbread, biscuits, breads, cakes, plain pastry
5. Selection and cookery of meats and poultry
   Beef, veal, mutton, lamb, pork, salt and smoked meats
6. Fish
   Fresh, canned, salt
7. Eggs, milk, cheese
   Combination of eggs, milk, and cheese
8. Puddings
   Custards and those with custard basis, gelatine, batter
9. Salads
   Fruit, vegetables, meat
10. Beverages
    Tea, coffee, cocoa
11. Frozen desserts
    Ices, sherbets, creams
12. Serving simple meals in laboratory as for grade work
    Planning, laying of table, waiting and serving
13. Canning and preserving
    Methods, principles involved, practical work in the simple processes of canning available fruit

DIETETICS

The purpose of this course is to present the fundamental principles of human nutrition and their application to the feeding of individuals, families, and larger groups under varying physiological, economic, and social conditions. The course aims to relate and apply the principles given in the study of foods and their preparation, physiology, and physiological chemistry. It includes recitation and laboratory work and is designed to be used as a basis for practical work in dietetics as well as for organizing and teaching the subject in the high school.

1. Review of chemistry and physiology of digestion
2. Metabolism of proteins, fats, carbohydrates
3. Determination of fuel values of foods
4. The 100-calorie portion as a unit and the determination of the weight of different foods yielding 100-calories
5. Modern dietary standards and their practical application
6. Computation of dietaries fulfilling the energy requirement at definite costs
7. Preparation of meals in dietaries worked out for special conditions and comparing the theoretical quantities of food with the actual quantity of food consumed
8. Protein metabolism and protein requirement. Nutritive ratio of foods and dietaries
9. Mineral metabolism,—study of investigations and present theories

10. Feeding of infants and children, underlying principles and their applications
11. Diet in diseases with especial reference to disorders of nutrition and metabolism
12. Planning and cooking of dietaries for especial diseases and estimation of their calorific value

ADVANCED COOKERY

This course gives practice in several phases of cookery, in selection and marketing of foods, making menus and serving meals. Especial attention is paid to the economic consideration of wise expenditure of time and money in food preparation. The processes carried out are more elaborate than in the junior year and self-reliance on the part of the student in the plan and execution of her work is encouraged.

The work includes food preservation, food preparation, study of the menu, of table service, individual work in the serving of meals, large quantity cooking and serving, the giving of demonstrations.

1. Food preservation
   Canning fruits, making preserves, jelly, pickles, experiments with different methods of canning fruits
2. Food preparation
   Preparation of vegetables, fruits, meats, cakes, pastries, salads, hot desserts, ices. The preparation of these is more elaborate than in the Elementary Cookery. Principles of cooking reviewed and applied independently,—comparison of different methods of work, value of form, computation of cost, including initial cost of material plus value of time and labor involved in preparation
3. Invalid cookery
   Gruels, beverages, broths, eggs, breads, laying of tray
4. The menu
   Planned to meet physiological needs, with reference to availability of foods in the market, cost of food and economy in labor
5. Marketing
   Review of system of production as it influences cost of food, time of marketing and selection of food, methods of purchase, co-operation of consumer and retail merchant, basis of selection, methods of accounting
6. Table service
   Forms, standards, controlling factors, cost of service, social values of accepted standards, adaptation of standard forms to existing conditions
7. Cooking and serving meals
   Application of subject matter above in individual work on typical problems
8. Large quantity cooking and serving
   Class work in preparation and serving of banquets for large numbers
9. Demonstration cooking
   The use of cookery to illustrate the lecture on principles and processes of cookery and the subjects of foods; discussions, individual exercises

PHYSIOLOGY AND HYGIENE

This course is planned for the purpose of teaching (a) the structure and function of the body, organs and tissues, (b) personal hygiene and individual health, (c) public hygiene and general health, (d) physiology and hygiene in relation to the school child.

The subject of Sex Physiology and Hygiene is given in a series of lectures by the instructor. Organization and presentation of subject matter and vital present-day school problems of hygiene are discussed.

1. Organs and tissues
2. Chemical composition of the body
3. Digestion
   Mouth, throat, oesophagus, stomach, intestines,—foods and food habits, diseases of the intestinal tract

4. Absorption
5. Circulation
   Blood, heart and blood vessels, path of circulation,—diseases of the blood
6. Respiration
   Nose, pharynx, trachea, lungs, mechanism of respiration and nervous control,—diseases of the respiratory organs
7. Excretion
   Kidneys, skin,—diseases of same
8. Skeleton structure
   Injuries to joints and bones
9. Muscle
   Structure, use, exercise
10. Nervous system,—general anatomy
    Care of and diseases of nervous system
11. Special senses
    Structure, care
12. Control of public health
13. Special physiology
    a. Physiology and hygiene of female reproductive organs
    b. Prophylaxis of social diseases
    c. Sex education

GENERAL CHEMISTRY

This course deals with the theories and processes fundamental to chemical science. It serves as a preparation for the succeeding courses, being, at the same time, closely related to every-day life by many applications. The most important points are reinforced by laboratory experiment.

1. Chemical change, elements and compounds, equivalents and atomic weights, symbols and formulas
2. Oxygen and oxidation, hydrogen and acids, the properties and laws of gases, the kinetic-molecular hypothesis and its relation to the gas laws
3. Water,—properties, purification, city water supply, solutions, freezing mixtures, osmotic pressure
4. Chlorine and bleaching, bromine and iodine, starch test
5. Valence and constitutional formulas
6. Dissociation in solution and its application to electrolysis, depression of the freezing point, osmotic pressure, strength of acids and bases, reaction in solution
7. Sulfur, surfur impurities in fuel gas, sulfur dioxide and bleaching, sulfuric acid, testing food materials for sulfurous acid
8. Nitrogen,—supply in the soil, ammonia, artificial ice, nitric acid and the nitrates
9. Atmosphere,—essential and accidental constituents, ventilation
10. Phosphorus, matches and "phossy jaw," phosphoric acid and the phosphates
11. Silicon and the silicates (mica, clay, sandstone, and granite), boron, boric acid and borates
12. Potassium and sodium, salts of sodium, sodium chloride, its manufacture and impurities, carbonate (washing soda), bicarbonate (baking soda), baking powders
13. Magnesium and calcium salts, limestone, lime, mortar, cement, bleaching powder, plaster of paris, glass, hard water, the softening of water
14. Iron, aluminum, copper, tin, lead, and zinc as to their uses in the household and their fitness for such uses

FOOD CHEMISTRY

Food chemistry is essential to the understanding of food materials and the reactions which occur in their preparation. A study of substances of simpler structure which are not foods but are of practical use in the home, serves as an introduction.

1. Petroleum and its products, illuminating gas and the products of coal tar, turpentine extractives
2. Halogen substitution products, chloroform, iodoform
3. Alcohols and fermentation, phenols
4. Ethers
5. Aldehydes and disinfection, acetone, quinones and dyes
6. Acids of fruits and vegetables, vinegar
7. Esters, the essential oils and flavoring extracts
8. Fats,—their properties and constitution, hydrolysis, hardening of vegetable oils, rancidity, emulsification, soap-making, the solvents of fats and the determination of the fat content of a food, as nuts
9. Carbohydrates,—the simple sugars, glucose, fructose, the determination of glucose with Fehling's solution, cane sugar, milk sugar, the inversion of sugars, starches, dextrin, cellulose, glycogen, gums, the chemistry of bread-making
10. Organic substances containing nitrogen, amines, amides, amino acids, the synthesis of peptids
11. Protein, properties and classification, the protein content of foods

CHEMISTRY OF NUTRITION

Prerequisites to this course are the ones in food chemistry and physiology. The aim is to show the chemical reactions within the body and the results of these reactions.

1. Human body
   Gross structure, internal structure of respiratory organs, alimentary canal, circulatory and lymphatic systems, cell structure, composition, necessary foods, tissues and secretions, blood, various fluids, muscles, nerves, bones, fat
2. Foods required in the body
   Process of digestion,—mouth digestion provides mastication, solution of foods, diastatic action, and involves a consideration of the salivary glands, their kinds, location, secretions, and of saliva, its composition, properties, diastatic action, limitations, agents retarding. Stomach digestion includes a study of the glands of the mucous membrane, kinds, occurrence, character of secretion; secretions, their composition, conditions exciting flow, influence of blood, etc.; action of juices, conditions retarding and promoting rapidity; special action of pepsin, rennin, gastric lipase. Intestinal digestion includes a similar study of the pancreatic juice, intestinal juices, and bile
3. Paths of absorption of digested foods
   Lacteal or lymphatic systems as carrier medium, necessary conditions, foods absorbed, changes during absorption; the portal system as carrier medium, process, foods carried, changes
4. Metabolism
   Constructive, conveyance of foods to cell, importance of capillaries, building up of absorbed foods into living tissues, destructive decomposition of foods and liberation of energy, disposal of waste materials
5. Products of metabolism
   Tissues and secretions, excretory products, source of muscular energy, heat equivalent of some common foods

MICROBIOLOGY

The modern courses of domestic science call for an investigation of bacteriological principles in order to make clearer the interpretation of such subjects as pure water supplies, sewage disposal, impurities of the air, dairying processes, fermentation industries, food preservation, immunity, transmission of disease, and sanitation.

The purpose of this course, therefore, is to show the influence of

micro-organisms such as the bacteria, the yeasts and the molds, upon the home and certain industries associated with the home.

1. Plant physiology
   Composition and structure of living matter, environmental influences upon life. The cell as the unit of life. The processes of respiration, digestion, growth and reproduction
2. Mushrooms
   General nature, distinction between poisonous and edible varieties, cultivation
3. Molds
   Morphology, growth and reproduction, types, use of molds; how to control them
4. Yeasts
   Structure of yeast cell, reproduction of yeasts, yeast types, conditions for growth, commercial varieties of yeast and their value
5. Bacteria
   Discovery of bacteria, methods of study, including preparation of culture media, sterilization, disinfectants and the tecnic of making pure cultures
   Structure of bacteria, mode of development, effect of physical and chemical agents upon bacteria
6. Cleanliness in the home
   Bacteria in relation to food preservation, bacteriology of milk and its products
   The nitrogen cycle, bacteria in the arts and industries, bacteria of the air, soil, and water
   Immunity, pathogenic bacteria and serums

MODEL AND PLAIN SEWING

The course in sewing includes the taking of measurements, the drafting of patterns, and the making of a complete set of underwear.

Hand sewing is emphasized at the first of the course, and later the care and use of the sewing machine is an important factor.

A study is made of suitable materials and trimmings for underwear, and practical problems for public school classes are discussed.

Each process is developed on practice material as a preliminary problem, and the application is then made on the garment.

A series of lessons is also given on the care and repair of clothing.

1. Corset cover,—hand work
   Measurements, patterns, drafting of patterns, suitable materials and trimmings
   Placing pattern on material, cutting of garment, basting, fitting, felling seams
   Finishing top and bottom, making of buttonholes
2. Lessons in darning
3. Drawers,—machine work
   Measurements, drafting of patterns, selection of materials and trimmings, study of machines
   Placing pattern on material, cutting garment, basting, fitting, felling seams
   Practice work on plackets
   Plackets applied to garment
   Finishing top and bottom
   Making of buttonholes
4. Lessons in patching
5. Nightgown,—machine work
   Taking measurements, drafting patterns, selecting materials and trimmings, placing pattern, basting, fitting, French seams
   Finishing top, putting in sleeves, hanging, finishing bottom
6. Skirt,—machine work
   Measurements, drafting, materials
   Placing pattern, cutting, basting, fitting, French or felled seams used
   Placket, finish top, hanging, finish bottom

DRESSMAKING

The problems of the course, a tailored skirt and shirtwaist of wash material and a dress of wool, one of silk and one of cotton, are presented with such subject matter as is necessary for a broad and intelligent view of dressmaking and its place in the field of textiles and clothing. The following phases are taken up in each problem, from the professional and academic standpoints:

1. Art, the study of the principles of costume design, color, line, proportion emphasizing originality, personality, suitability and simplicity in costume
2. Economics, the selection of materials and comparison of home and shop-made garments as to cost, durability and suitability; proportion of income to be used for clothing and clothing budgets.
3. Hygiene, choice of materials as to season, cleansing properties, lines and general construction of garment
4. Construction, drafting, use of commercial patterns, technical details of construction as are needed for making of varied kinds of dresses and materials. Models of plackets and various finishes are made for use as illustrative material

NOTE: A student will do well to plan her year's wardrobe with reference to the addition of these costumes. Approximate cost of materials, $30.00.

ART NEEDLE WORK

Art needle work is planned to give training in the application of a knowledge of design and skill in fine needle work for the finishing or decoration of articles of clothing or house furnishing. The different lines of art needle work are considered under the heads given below and worked out upon articles chosen by the students.

1. Characteristics of design suited to various lines of needle work
2. Design
   Adaptation to particular line of needle work
   Articles suited to kind of finish or decoration
   Materials suited to finish, decoration, design
3. Study of materials
   Source, selection, combination, cost
   Needle work stitches and finishing
4. Kinds of work
   Crocheting, knitting, ornamental darning, applique, cross stitch, Swedish weaving, hemstitching, drawn work, French work, scallops and dots, eyelets, initials, cut work

TRADE DRESSMAKING

The aim of the course is to prepare teachers for trade dressmaking classes and to afford students an opportunity to acquire skill in the designing, planning, cutting, fitting and finishing of garments. Each student drafts, cuts, bastes, fits, makes alterations, and finishes waist linings, shirtwaists, sleeves, and skirt models. Members of the class fit each other in working out the foregoing exercises. Trade work includes making of tailored skirts and waist suits, woolen and cotton dresses, silk, woolen, veiled and lingerie waists and gowns, and any other suitable problems that may be brought to the school.

Lectures and class discussions accompany the practical work throughout the year. Some of the problems taken up are as follows:

Advantages and disadvantages of drafted and commercial patterns; drafting in elementary and secondary schools; study of trade schools, their purposes, courses of study, results; planning courses of study for trade school classes, for example, shirtwaist class, or plain sewing class.

1. Drafting waist linings, sleeves, skirts
   Purpose of, direction for, drafting patterns, testing, seams, allowance, tracing, cutting
2. Designing
   Using foundation patterns, designing pleated, draped or fancy waists, sleeves, skirts, dresses, making paper, cambric or cheese cloth patterns of same
3. Cutting
   Placing pattern, pinning, marking, cutting, basting
4. Fitting
   Objects to be considered, elementary directions for normal and abnormal figures
5. Finishing
   Waist linings, i. e., seams, plackets, hooks and eyes, buttons, lining, belting
   Sleeves, including seams, placket, cuffs
   Skirts, including seams, belt, placket, hems, plaits, and tucks
6. Draping
   Arranging in foundation linings, skirts, yokes, collars, sleeves, waists
7. Costume design
   Study of lines and harmony; fabrics, suitability, utility, trimmings, designing for patrons

TEXTILES

The purposes of the course are the presentation of such materials that the student may form an intelligent basis for judging the quality and durability of textile fabrics for household and personal use; may realize the responsibility of the consumer and producer to each other; and may gain suggestive helps for making her teaching the subject a vital force.

1. Textile industries in early times
   Spinning and weaving, implements in use, power employed, fundamental weaves with characteristics and practical value of each, social and industrial conditions of the period
2. History of textile industry since 1790
   Development of textile industries in United States from 1790 to 1860
   Types of machinery used and power employed, economic, social, and industrial conditions
   The industrial revolution, 1860-1914
   The development of the large factory, the rise of mixtures and adulterations, the work of the chemist in making a cheaper fibre take on the appearance of a more expensive one, the work of the inventor in making machinery which will produce an infinite variety of effects on various fabrics
3. Study of vegetable fibres, cotton and linen, under the following heads, as influencing quality, use, price:
   Characteristics of the fibre, varieties, distribution, production, manufacturing processes, comparative value, distinguishing characteristics of each, unreliable products, other vegetable fibres
4. Study of fibres of animal origin, wool and silk, under the following heads as influencing quality, use, prices:
   Characteristics of the fibres, factors favorable and unfavorable to the production of good fibres, varieties and distribution, manufacturing processes which affect durability, use, or appearance of the fabric, tests for distinguishing shoddy, spun, and artificial silks from materials of first value, uses of materials of secondary value, unreliable products
5. Care of clothing

   Dyes and their effects on fibres, effect of exposure to light, dust, friction, temperature; cleaning agents,—water, alkalis, hydrocarbons
6. Development of the consumers' judgment
   Through sense of touch, by contrasting appearance, by use of household test, by use of microscope, by use of chemicals

MILLINERY

Designing, making, trimming, and decorating of fall and spring hats with a view to developing originality, invention, and skill are the main purposes of this course. Stress is placed upon the artistic side of the work by study of the harmony of color and line. The practical side is also taught by emphasizing economy in the utilization of old material by renovating and tinting. Distinction and individuality in the product are secured by the making of flowers, ornaments, and other trimmings. Suggestions for the adaptation of the work to high schools, and to continuation and trade school classes are made throughout the course.

1. Wire work for fall millinery
   Bandeaux, stocks, buckles, frames. Design of frame, handling wire, cutting, fitting, and fastening
2. Tinting and renovating materials
   Gasoline, oil paints, dyeing, selection and use of colors
3. Millinery stitches
   Running, back, overcast, feather, buttonhole, slip, catch, saddler's stab, lacing
4. Folds
   Milliner's and French
5. Flower and bow making and trimming
   Making of roses and violets, tissue paper bows, even and uneven loops, rosettes; use of silk ribbon, maline, and lace; making of buckles and cabachons
6. Buckram frame
   Designing of hats, shaping of material, finishing frame, covering, trimming, lining
7. Street hat for spring millinery
   Wire frame, covering, straw sewing, trimming, finishing

MECHANICAL DRAWING.

A course of lectures and the making of drawings are included as a part of the regular work in preparation for teaching the household arts in public schools. A series of exercises is given to develop suitable technique and familiarity with drafting conventions, and these are followed by the making of working drawings of pieces of school equipment and layouts of school rooms. The course ends with the making of plans and elevations of small cottages and a study of building details and conveniences.

1. Lettering exercise
   Giving special attention to the proper proportions of a suitable type of lettering for the making of working sketches and simple mechanical drawings
2. Line exercise
   Providing opportunity for practice with the various kinds required in common drafting usage
3. Projection drawing
   Representing solid objects shown in three views and completely dimensioned
4. Working drawing of stand
   Designing pieces of furniture and putting dimensions upon details of construction

5. Kitchen table
   Making of drawing of table suitable for use in domestic science classes
6. Storage cabinet
   Determining desirable arrangements, study of construction, making of complete drawing
7. School kitchen
   Location of doors and windows, placing of furnishings, making of scaled architectural sketch of scheme
8. Plan of cottage
   Studying problem of house planning, determining size and shape of rooms, considering conveniences and constructive details, use of architectural conventions
9. Elevation of cottage
   Selecting type of exterior suitable for style of cottage, examination of exterior details, making of front and side elevations
10. Interior wall arrangements
    Adjusting paneling and other woodwork to use and attractive appearance, developing four walls of one room
11. Two-story frame house
    Sketching plans and elevations for modest dwelling
12. Perspective
    Drawing in perspective to show more real appearance of objects

DRAWING AND DESIGN

The aim of this course is to give the students an understanding of the underlying principles of good design and an ability to appreciate good design. It offers in sequence the principles of design and the essentials of color harmony.

The work is planned to meet the needs of the present day industrial training and especially emphasizes problems in relation to domestic arts, such as: adaptation of forms to fill various spaces; changing proportions; adaptation of pattern to materials; manner in which materials condition treatment; various materials discussed with changes necessary for adaptation of a given pattern.

a. Design

1. The laws which govern constructive, pictorial, and decorative design
2. The application of such design to the various problems in industrial education

b. Drawing

1. The analysis of each problem is carried on with different mediums, so that a practical knowledge of drawing is obtained. The following mediums are used: pencil, water color, crayons, charcoal, ink, blackboard
2. The practice and theory of color is worked out through the plant analysis for the purpose of composition and design
3. Special attention is given to the relation between good design and color values, to the stitchery and craft problems
   a. House furnishing: simple form and quiet color
   b. Household linen: initials and monograms
   c. Color combinations applied to dress
4. A short course in artistic anatomy is given; also a sketch class from life, to enable the student to quickly sketch the human figure, to facilitate the work in costume designing and dressmaking
5. Perspective is taught to enable the student to illustrate problems before the class by the delineation of cylindric or rectangular objects
6. A thorough drill in parallel and angular perspective as applied to interiors and constructive drawings

INTERIOR DECORATION AND FURNISHING

The course is taken up under two heads: first, the principles underlying good proportion and color harmony are studied; second, the application of these principles to house planning and furnishing is made. The course is designed to enable the student to plan an attractive, comfortable house that may be built at a moderate cost; to apply artistic and economic principles in determining appropriate and artistic furnishings and decoration and to select from the house furnishings now on the market, such as wall papers, rugs, furniture, etc., the most artistic and the best for the money expended.

The professional side of the work is considered throughout the course with the idea that the student may teach the work in high school.

House planning
1. Exteriors,—location, building materials, architecture
2. Interiors,—first and second floor plans of a house not to exceed $4,000 in cost

Good proportion
1. Theory of proportion,—balance, rhythm, harmony
2. Application to a living room,—breaking of wall spaces, arrangement of windows, doors, built-in furniture, and fireplace

Color
1. Theory of color,—the spectrum, grayed colors
2. Color analysis, wall papers, rugs, woodwork, hangings, and furniture analyzed as to color
3. Color harmony, contrast and analogy, effect of light, application of color scheme to the living room, harmonious color schemes are worked out for other rooms, considering exposure, use of room, psychological effect of color

Selection of furnishings and decorations
1. Woodwork,—construction, color, finished floors, standing woodwork and beams
2. Wall coverings,—plaster, oil paints, water paints, paper, cloth
3. Hangings,—window curtains, portieres
   Experiments are tried with wall coverings and hangings in a model room
4. Floor coverings,—rugs, carpets, matting, linoleum
5. Furniture,—cost, construction, and design. Stocks of furniture are studied in the shops. Arrangement of furniture is studied in rooms available for the purpose
6. Pictures and picture hangings, bric-a-brac

The rooms of the house
   During the previous work the furnishing and decoration of a living room, dining room, and bedroom have been worked out by each student. The furnishing and decoration of the kitchen, hall, library, nursery, and porch are taken up as class problems

Refurnishing and remodeling houses

PSYCHOLOGY AND PEDAGOGY

See under Manual Training Outline of Courses for scope of work.

OBSERVATION AND PRACTICE TEACHING

See under same heading, Manual Training.

GENERAL ORGANIZATION AND MANAGEMENT

The following course has as its aim the working out of the relation of the subjects of instruction included in a complete home economics course and the indicating of the peculiar training possibilities of each

subject as well as the organization of practical information needed by a teacher in introducing or conducting the work.

1. History and status of home economics in schools
2. Practical and educational purposes in its teaching
3. Scope of the subject: Sciences,—chemistry, physiology, biology, physics. Art,—use of color, design, house decoration, designing of costume. Economics,—relation of home to surroundings, social and industrial
4. Place in course of study
   Relation to other lines already taught, sequence of work as determined by psychological and physical principles
5. Planning of courses of study
   Influence of environment, development of pupil, possibilities of school system
6. Organization of classes
   Records, attendance, standard of class marking
7. Presentation of subject matter
   Preparation for lesson, lesson plan, preparation of materials, presentation, theoretical treatment, method of conducting, practical application
8. Study of equipment; rooms
   Plans, dimensions, furnishings,—kinds, cost, where obtained
9. Cost of maintenance
10. The special teacher
    Attitude toward other lines of work, relations with regular teachers, supervision and conduct of teacher's classes

EMERGENCIES AND HOME-NURSING

This course gives the practical treatment of simple ailments of the human body and methods of handling emergencies that may occur in the home, the school, or elsewhere.

1. The sick room
   Location, furnishing, ventilation, care
2. Beds and bed-making
   Lifting and handling patient
3. Baths and bathing
4. Observation of temperature, respiration, pulse, administration of medicine
5. Local applications
   Plasters, poultices, blisters and other counter-irritants, hot and cold compressors
6. Contagion and disinfection
   Infectious diseases, modes of propagation, fumigation and disinfection
7. Emergencies
   Fainting, drowning, scalds and burns, frost bites, hemorrhage, sprains and fractures, poisons and antidotes
8. Bandaging
9. Study of diseases
   Tuberculosis, typhoid fever, colds

HOUSEHOLD MANAGEMENT

Household management furnishes an opportunity to assemble the numerous lines of instruction and fields of experience necessary to administer the affairs of a household, into one general course. The primary purpose of this line of work is to show the relations of science, art, economics, and their practical application.

Because of the scope of the subject and the necessity for little equipment in its teaching, household management presents greater teaching possibilities than many lines of instruction. The development of the

subject, its training value, and methods of presentation are included as a part of the instruction.

1. House sanitation
   Location, site, drainage, water supply
   Heating, lighting, ventilation
2. Finishes and furnishings
   Floor, floor finishes, floor coverings
   Walls, wall finishes and coverings
   Windows, shades, draperies
   Suitable furnishings for various rooms in the home under various conditions
   Advantages and disadvantages of kinds and quality of finishes and furnishings with regard to sanitation and economy and necessary care of same
3. Household organization
   Necessity of system in the household
   Division of labor, daily and weekly schedule
   Discussion of household service problems, an attempt to answer these questions: Who shall do the work? When, where, and how shall it be done?
4. Household expenditures
   Need of business management in the home
   Classification of expenditures, division of income
   Methods of purchase, keeping of accounts, paying of bills
   Discoveries of leakage in household expenditures
5. Pedagogical problems
   In connection with each subject attention is given to the practical application of the above problems, not only for the home, but also as to the best methods of presenting the work to public school classes

INSTITUTIONAL MANAGEMENT

The purpose of the course is to acquaint students, (who already have the ability to organize, control and direct) with the fundamental principles and correct practices involved in the theory and art of managing the activities of commercial, educational, and philanthropic institutions, so as to best promote the economic, sanitary, and aesthetic welfare of the individual and group in order to procure the highest satisfaction for all within the sphere of the institution.

1. Phases of institutional work
   Commercial (hotels, summer resorts, lunch and tea rooms)
   Educational (school dormitories, school lunches)
   Philanthropic (asylums, homes, hospitals)
   Social (clubs, settlements, camps)
   Governmental (state, county and municipal, alms houses, reformatories, etc.)
2. Qualifications of managers or directors
   Native ability
   Mature experience
   Social aptitude
   Good judgment
   Initiative
3. Duties
   Stewards
   Superintendents
   Housekeepers
   Directors of halls
   Matrons
   Laundry managers
4. General organization
   Forms of organization in industrial world
   Definite plans
   Establish lines of authority
   Necessity for system
   Service problems
   Division of labor
   Specialized labor
   Standardization of tasks
   Records
   Accounts
   Inventories
5. Regulation of expenditures
   Probable income and distribution in regard to care, repair, maintenance, and operating expenses

Managing finances so as to obtain the best results

6. Planning and general care of buildings, rooms for specific purposes
   - Kitchens
   - Serving pantries
   - Diet kitchens
   - Dining rooms
   - Living rooms
   - Sleeping apartments
   - Storage facilities
   - Linen closets
   - Employee accommodations
   - Refrigeration
   - Laundry
7. Furnishing and equipment
   - Kinds and types required for various purposes
   - Judging, selecting and buying furniture, carpets, rugs, bedding, silver, linen, china, cooking utensils, stationary equipment such as ranges, bake ovens, steam cookers, steam tables, dishwashers, bakery, and laundry equipment
   - Estimate requirements
   - Estimate cost per person
   - Care, repair and renewal
8. Dietaries
   - Food requirements as influenced by dietary and psychological aspects
   - Problems of service
   - Facilities for preparing
   - Suitability
   - Digestibility
   - Variety
   - Cost of food in relation to income
   - Study of standardized dietaries for typical institutions
   - Planning of weekly menus for school lunch rooms, hospitals, dormitories, and cafeteries
   - Adaptation of recipes
9. Marketing
   - Market conditions
   - Methods of purchasing
   - Laws relating to adulterations, weights and measures, and market sanitation
   - Specifications, bids, contracts
   - Testing, buying and storing of meats, staple and perishable groceries, milk, butter, etc.
   - Estimate amount necessary per person
10. Laundering
    - Commercial
    - Institutional
    - Utensils, material and appliances
    - Methods
11. Sanitary and economic considerations
    - Waste versus refuse
    - Sources of waste
    - Disposal of refuse
    - Hygiene of materials and equipment

ENGLISH

English as given in connection with the Home Economics courses is designed to aid the student to overcome bad habits of speech and writing. Oral topics relating to the special subject form the nucleus of the recitation work. For written work, daily paragraph themes illustrating various methods of presentation and exposition are required for the larger part of the course, outlines for all oral topics are prepared, and at least one long theme is written. In the paragraph theme, attention is paid to matters of punctuation and correctness of idioms rather than to grace of style.

PHYSICAL TRAINING

Opportunity is offered to students for physical training in regular classes in the gymnasium and natatorium.

ELECTIVES

In the selection of electives students advise with and secure approval of the director of the department.

HOME AND SOCIAL ECONOMIC COURSES

1. Evolution of the House and Home
2. Evolution of Marriage and the Family
3. Ethics of Family Life
4. Disintegration of the Modern Family
5. Euthenics
6. Eugenics
7. Infant Mortality
8. Ethics of Spending
9. Domestic Service Problem
10. Education for Parenthood
11. Sex Education
12. Woman in Modern Industry
13. Woman in Social Service

Special outlines of any of these courses sent on application.

SCHEDULES OF HOME ECONOMICS CLASSES

JUNIOR YEAR

Psychology and Pedagogy
English
Food Study
Elementary Cookery
Physiology and Hygiene
Home Nursing
Model and Plain Sewing
General Chemistry
Food Chemistry
Mechanical Drawing
Drawing and Design
Physical Training

SENIOR YEAR

Organization of Home Economics
Observation and Practice Teaching
Dietetics
Advanced Cookery
Household Management
Dressmaking
Textiles
Art Needlework
Millinery
Microbiology
Chemistry of Nutrition

Interior Decoration and Furnishing*
Institutional Management
Home and Social Economics*
Trade Dressmaking*
Physical Training*

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*Optional Senior Courses

THE HOMEMAKERS SCHOOL

GENERAL STATEMENT

This school is a department of The Stout Institute maintained for the purpose of preparing young women who do not wish to teach, for the responsibilities of the homemaker.

The school has been in existence eight years. The character of the work done by the students who have completed the course, their estimate of its value, and the favorable judgment expressed by scores of intelligent men and women from all parts of the country, who have visited the school, studied its plan of organization, and observed its work, all combine to approve the action of its founders in organizing the school.

No attempt has been made to secure a large attendance, because of the rapid growth of the other departments of the institute and the consequent limited accommodations available for the homemakers' school.

It is hoped that in the near future the new buildings to be provided will make it possible to remove the limit on attendance.

A bulletin giving detailed information concerning the courses offered in this school will be sent upon application.

TRADES SCHOOL

PLUMBING AND BRICKLAYING TRADES

This school is organized to meet the demand for men in the trades who possess the necessary technical knowledge, and skill in applying that knowledge through modern methods in construction work. Young men are able to secure this theoretical and practical training under competent instructors in much less time than under the apprenticeship system. Even when the apprenticeship conditions are most favorable, but little knowledge of the fundamental principles underlying the correct trade processes are ever acquired by the apprentice. With the instruction and practical training given in this school, its graduates are able to command good wages at once, and to become skilled workmen within a short time after completing their course of instruction in the school. It is not claimed that the completion of either of the courses in the school will entirely take the place of practical experience in the trade, so necessary for the skilled mechanic, but that these courses of instruction, when mastered, materially shorten the time required for a full mastery of the trade, and give a much better knowledge of the principles which determine the best trade processes and practice than can be obtained in any other way.

The work in each department is designed to meet the needs of the man who has already done some work in the trade as a workman, but who wants to strengthen and broaden his preparation through systematic instruction and training adapted to his special needs. It is also designed to meet the needs of the man who has no knowledge of the trade processes or of the principles underlying them and who wishes to take the necessary steps to become a skilled workman with capacity for leadership, in the shortest possible time.

A special circular of information gives details of these courses. A copy will be sent upon request.

FURTHER INFORMATION

Inquiries regarding the purpose and character of work offered at The Stout Institute, the regular courses of study or those of the summer session, the Bulletin and other publications of the school; or inquiries regarding the qualifications of Stout graduates for the teaching of special subjects, should be addressed to

L. D. HARVEY,
President The Stout Institute,
Menomonie, Wisconsin.

THE 1914 SUMMER SESSION

The ninth annual summer session of The Stout Institute opened July 27th and closed August 28th, 1914. Eighty-five courses of study were offered. Thirty states and two foreign countries were represented by students in attendance; 186 men and 213 women were enrolled in the various classes, the total enrollment being 399.

Below are six groups of courses which were offered in the manual arts and physical training, fifty-nine courses in all:

GENERAL COURSES

1. Manual Training Theory
2. Organization of Manual Training
3. Industrial Economics
4. Principles of Design
5. Plumbing Theory

DRAWING

6. Elementary Mechanical Drawing
7. Projection Drawing
8. Professional Drawing
9. Introductory Drawing
10. Elementary Machine Drafting
11. Advanced Machine Drafting
12. Elementary Architectural Drafting
13. Advanced Architectural Drafting
14. Architectural Details
15. Architectural Drafting Practice
16. Pencil Sketching
17. Furniture Design
18. Shop Design and Drawing
19. Interior Decoration

METAL WORK

20. Elementary Forging
21. Agricultural Forging
22. Professional Forging
23. Tool Smithing
24. Art Smithing
25. Elementary Machine Shop Practice
26. Advanced Machine Shop Practice
27. Millwrighting
28. Foundry Practice
29. Saw Filing
30. Hammered Copper Work
31. Jewelry and Silver Work

WOOD WORK

32. Elementary Woodwork
33. Joinery
34. Elementary Cabinet Making
35. Table Construction
36. Case Construction
37. Mill Work
38. Veneering
39. Elementary Wood Turning
40. Advanced Wood Turning
41. Carpentry Construction
42. Pattern Making
43. Elementary Wood Finishing
44. French Polishing
45. Varnishing and Rubbing

OTHER SHOP COURSES

46. Primary Handwork
47. Clay Modeling
48. Pottery Making
49. Elementary Bricklaying
50. Advanced Bricklaying
51. Cement Work
52. Plumbing Practice
53. Elementary Printing
54. Advanced Printing
55. Lettering and Sign Painting

PHYSICAL TRAINING

56. Gymnastics
57. Swimming
58. Athletics
59. Public School Physical Training

Below are listed four groups of courses which were offered in the household arts, twenty-four courses in all:

GENERAL COURSES

60. Organization of Home Economics
61. Household Management
62. Home Nursing
63. Home and Social Economics I
64. Home and Social Economics II
65. Home and Social Economics III
66. Institutional Administration

DOMESTIC ART

67. Plain Sewing
68. Model Sewing
69. Art Needlework
70. Millinery
71. Dressmaking
72. Cutting and Fitting
73. Costume Designing
74. Textiles

FOODS AND COOKERY

75. Food Study I
76. Food Study II
77. Elementary Cooking I
78. Elementary Cooking II
79. Advanced Cooking
80. Dietetics

APPLIED SCIENCE

81. General Chemistry
82. Food Chemistry
83. Chemistry of Nutrition
84. Household Chemistry
85. Microbiology

Similar courses are being planned for the summer session of 1915.

NEW BUILDING FOR THE DEPARTMENT OF DOMESTIC ECONOMY

Friends of The Stout Institute will be glad to know that a contract has been let for the erection of the new domestic economy building, for which a $200,000 appropriation was made by the legislature. Excavation has already been begun for the basement, and the masonry work will be commenced as early as possible in the spring. The contract calls for the completion of the building, ready for occupancy, January 1, 1916. The building is 238 feet long, 118 feet wide, with four full stories above a high basement. It provides an auditorium capable of seating one thousand people.

Locker rooms are provided in the basement of sufficient capacity to accommodate five hundred students. A cafeteria, laundry with connected recitation room for instructional purposes, storage rooms and ventilating fans occupy the remaining portion of the basement. The library, auditorium, administration offices and exhibit rooms occupy the greater portion of the first floor.

The second floor is devoted entirely to dressmaking, plain sewing, millinery, art needlework, trade dressmaking, model sewing, recitation rooms, costume designs and a textile laboratory.

The third floor is given entirely to the cooking department, having five large kitchens with smaller practice kitchens, practice dining rooms, store rooms, recitation rooms, and a large demonstrating lecture room.

On the fourth floor are located three large chemical laboratories, biological laboratories, large rooms for free hand drawing and interior decorative art, and demonstrating lecture room with raised platform.

The building will be equipped with a complete master clock and secondary clock system, with a signal system for classes throughout the entire building.

The plans provide for two elevators of large capacity to make it possible to move students from one floor to another with the greatest facility. The building is planned to furnish adequate accommodations for five hundred students. In each of the past three years more than five hundred students have sought admission to the department of domestic economy. It is expected that the Institute will be prepared to care for that number of people at the opening of the second semester, 1916.

Much time and study have been given to working out the plans for this building so as to thoroughly adapt it to the needs of the department. The best buildings of this type in the United States were visited and studied by the architect and the President of the Institute before beginning work upon the detailed plan. It is believed that there is no other building in this country devoted exclusively to the teaching of domestic economy so well adapted to this purpose as this new building for The Stout Institute.

CALENDAR FOR 1915-1916

Tenth Annual Summer Session begins July 26, 1915
Summer Session ends August 27, 1915

Thirteenth Regular Session begins September 6, 1915
Holiday vacation—December 17, 1915-January 2, 1916
First Semester ends January 21, 1916
Second Semester begins January 24, 1916
Spring vacation—March 24, 1916-April 2, 1916
Thirteenth Regular Session ends June 2, 1916